THE IMPACT OF GOVERNMENT REGULATORY, TAX AND LEGAL POLICY

HEARING

BEFORE THE

SUBCOMMITTEE ON TECHNOLOGY

OF THE

COMMITTEE ON SCIENCE

U.S. HOUSE OF REPRESENTATIVES

ONE HUNDRED FOURTH CONGRESS

FIRST SESSION

SEPTEMBER 28, 1995

[No. 18]

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*Ranking Minority Member
**Vice Chairman

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THE IMPACT OF GOVERNMENT REGULATORY, TAX AND LEGAL POLICY

THURSDAY, SEPTEMBER 28, 1995

U.S. HOUSE OF REPRESENTATIVES
COMMITTEE ON SCIENCE
SUBCOMMITTEE ON TECHNOLOGY
Washington, D. C.

The Subcommittee met at 9:45 a.m., in Room 2318 of the Rayburn House Office Building, the Honorable Constance A. Morella, Chairwoman of the Subcommittee, presiding.

Mrs. MORELLA. Ladies and gentlemen, I think I'm going to start. I call the meeting to order.

There will be other members that will be joining us. There is a conference of the Majority Party now that will be terminating by 10:00, and others will be joining us. But I think, in the interest of time, and because there will be opening statements, we'll now progress.

The Technology Subcommittee, as you know, has jurisdiction over all aspects of our nation's technology and competitiveness policy. Included in this jurisdiction is explicit oversight and investigative authority into antitrust, regulatory, tax, and other legal and governmental policies which relate to technological development and commercialization.

We are exercising our jurisdiction today over these issues to discuss their effect on our nation's competitiveness, as part of this Congress' technology and competitiveness focus.

From the beginning of my congressional tenure, I've served on the Science Committee. In that time, the Committee has made various efforts to promote and facilitate the creation and development of technologies by United States companies. The Committee has had success in this effort of legislating new technology programs.

However, in order to most effectively promote technology creation and development, we must also broadly examine alternative factors to our nation's ability to compete in the global marketplace.

The impact of these factors, such as our macroeconomic and governmental policies, are very important, since the successful promotion of technology and competitiveness are significant determinants of our nation's sustainable economic growth, productivity improvement, and competitive standing.

We need to fully examine the root causes of the competitiveness problems facing United States industry. And perhaps the foremost avenue to fuel United States economic growth and private sector job creation, is to reduce the national debt—we're trying—and thereby lower the cost of capital.

Moving towards a balanced federal deficit and eliminating our national debt would create such a favorable economic climate for technology development that it is the single most effective effort that we can undertake.

Eliminating the debt, however, is but one of many methods to enhance our nation's industrial competitiveness. Other methods include:

Providing tax incentives, such as a capital gains reduction and the R&E tax credit, to further enhance private capital formation;

Secondly, modernization of antitrust laws to recognize global market competition and remove outdated barriers to cooperative enterprise;

Thirdly, civil justice reform, such as uniform product and professional liability standards to reduce litigious burdens and costs;

Four, alignment of the education of students with the skills that employers need; and

Five, a review of new government regulations to prevent unintended effects, such as product restrictions and technological delays.

We have two very distinguished panels today as we explore whether tax relief and deregulation, combined with targeted changes in the United States legal and educational system, will help ensure the long-term growth of emerging industries. I am looking forward to their testimony and discussing these issues with them.

I'd like to welcome our first panel. Philip Howard, the author of the bestseller, "The Death of Common Sense," which has gotten some superlative reviews; and Dr. Allan Mendelowitz, from GAO, who, incidentally, is a constituent of mine.

Our second panel is comprised primarily of industry executive officers who can offer their practical and first-hand insights into these impacts upon our nation's businesses. I will be introducing them later as we commence the second panel. I would now like to recognize the Chairman of the Full Committee, Mr. Walker.

[The prepared statements of Mrs. Morella, Mr. Walker, Mr. Tanner, and Mr. Brown follow:]

CONSTANCE A. MORELLA
CHAIRWOMAN
SUBCOMMITTEE ON TECHNOLOGY

OPENING STATEMENT

HEARING ON IMPACT OF GOVERNMENT REGULATORY, TAX, AND LEGAL POLICY ON TECHNOLOGY

SEPTEMBER 28, 1995

Good morning. I call this subcommittee hearing to order.

The Technology Subcommittee has jurisdiction over all aspects of our nation's technology and competitiveness policy. Included in this jurisdiction is explicit oversight and investigative authority into antitrust, regulatory, tax, and other legal and governmental policies which relate to technological development and commercialization. We are exercising our jurisdiction today over these issues to discuss its effect on our nation's competitiveness, as part of this Congress' technology and competitiveness focus.

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We need to fully examine the root causes of the competitiveness problems facing United States industry. Perhaps the foremost avenue to fuel United States economic growth and private sector job creation

is to reduce the national debt, and thereby lower the cost of capital. Moving towards a balanced Federal deficit and eliminating our national debt would create such a favorable economic climate for technology development that it is the single most effective effort we can undertake.

Eliminating the debt, however, is but one of many methods to enhance our Nation's industrial competitiveness. Other methods include: (1) Providing tax incentives, such as a capital gains reduction and the R&E tax credit, to further enhance private capital formation; (2) Modernization of antitrust laws to recognize global market competition and remove outdated barriers to cooperative enterprise; (3) Civil justice reform such as uniform product and professional liability standards to reduce litigious burdens and costs; (4) Alignment of the education of students with the skills that employers need; and (5) A review of new government regulations to prevent unintended effects such as product restrictions and technological delays.

We have two very distinguished panels before us today as we explore whether tax relief and deregulation, combined with targeted changes in the U.S. legal and educational system, will help ensure the long-term growth of emerging industries. I am looking forward to their testimony and discussing these issues with them.

I would like to welcome to our first panel, Philip Howard, the author of the bestseller, "The Death of Common Sense," and Dr. Allan Mendelowitz from GAO. Our second panel is comprised primarily of industry executive officers who can offer their practical and first-hand insights into these impacts upon our Nation's businesses.

I would now like to recognize the Ranking Member of the Subcommittee, Mr. Tanner, the distinguished gentleman from Tennessee.

OPENING REMARKS BY CHAIRMAN WALKER

The difference between rich nations and poor nations is not that the rich have more money than the poor ones, but that rich nations produce more goods and services. One reason they do so is that their *technology* is superior. Technology is what Dr. Joel Moykr of Northwestern University calls the "*lever of our riches.*" It is a cost-reducing, output-augmenting change in the application of knowledge that, in a sense, provides us with a "free, or very cheap lunch." That is, technology leverages our resources such that we can achieve an increase in output that outweighs the increase in cost and effort to bring it about. Technological creativity has been the engine of our economic growth. It is at the very base of America's greatness. And our future...

All over America, scientists and entrepreneurs are working toward a better and brighter future. Spectacular breakthroughs in computers, electronics, molecular medicine, materials, microminiaturization, artificial intelligence and virtual reality will forever change the way we communicate, learn, work and live. Throughout this country,

corporations are re-engineering to produce more and better products and services with fewer resources, and less waste and adverse impact on our environment. Our private sector is reacting swiftly and decisively to changes in the economy and innovations in the marketplace. Yet, government is the least changed major institution in America. Government today works on the same philosophy as Henry Ford's Model "T"..."you can have it any color you want as long as it's black." These uniform, "one size fits all" policies have long been superseded by contemporary business practices.

We cannot prepare for the future by clinging to the past. We *can have* a leaner, better, more efficient government--one that does more and serves people better with fewer resources. We *can have* a government that rewards individual achievement, self-reliance, a willingness to accept risk and a propensity for change. We *can have* an environment with less regulation, less litigation, less red tape, less centralized bureaucratic micro-management. We *can have* an incentive structure that stimulates investment and rewards an entrepreneurial spirit. We *can have* a government that puts a premium on creativity, diversity, and the ability of free people to invent new ways of solving

problems. We *can* do it. All we need is the will to succeed and the courage to begin.

I thank our Subcommittee Chair, Mrs. Morella, for initiating this vitally important examination of the impact of government policies on technological development and our economic competitiveness.

OPENING STATEMENT
HONORABLE JOHN S. TANNER (D-TN)
SUBCOMMITTEE ON TECHNOLOGY
HEARING ON
IMPACT OF GOVERNMENT REGULATORY, TAX AND LEGAL POLICY ON TECHNOLOGY DEVELOPMENT AND COMPETITIVENESS
SEPTEMBER 27, 1995

I am pleased to be taking part in the first of a series of very important hearings. Members on both sides of the aisle agree that we need to reform our regulatory, tax, and legal policies and we agree that these changes will benefit industry's bottom line. However, the key question for this Committee is: whether macroeconomic policies are a substitute for direct federal support of long-term, high-risk technology development. The debate has been framed in such a way to draw the conclusion that if we make changes in macroeconomic policy then we can cut federal support for technology development and commercialization programs. The Chairman stated this clearly in our last hearing:

> "We have people who suggest in Congress that because we have all of the bad policies at the macroeconomic level, then we ought to come up with all kinds of Government spending to supplement businesses' inability to compete. ... let's change macro-economic policies, let's make structural changes in regulation, taxation, and litigation, ... and then you can get rid of some of the superfluous superstructure that the Government has that supposedly makes our companies more competitive."

We should scrutinize government programs, cut programs that don't work, and develop a plan that will effectively promote technology development in the United States. What we shouldn't do is proclaim all these government programs "corporate welfare" and blindly terminate them without any legitimate review. These cuts won't affect our ability to compete today, but they will affect our ability to compete tomorrow.

I also want to make clear the size of federal programs that promote technology commercialization. Although in this Committee, the debate on federal technology development programs has focused almost solely on the Advanced Technology Program (ATP) and the Manufacturing Extension Partnership (MEP) at National Institute of Standards and Technology (NIST), these programs are only a small part of the total Federal effort.

According to a recent Congressional Budget Office (CBO) report (July 1995), the Federal Government will spend $12 billion on programs that support industrial

technology commercialization. What programs are included in CBO's list? A few of the programs included are $378 million at the National Science Foundation (NSF); $900 million for the Small Business Innovation Research Program (SBIR); and $3.7 billion at the National Institutes of Health (NIH) for applied biomedical research (NIH uses almost $1 billion of these funds for the preclinical and clinical development of specific drugs). I am not criticizing these programs, I believe government/industry partnerships can and do benefit the public. The point I am trying to make is the federal government spends a significant portion of its R&D budget on technology commercializtion of programs which span a wide range of activities and fields.

We are at a crossroads in federal science and technology policy as we try to balance the budget while ensuring the long-term economic growth of the country. Dr. Judith Giordan, one of our witnesses today, is right on target in her written testimony:

> "... it is critically important to acknowledge that for all technology-based enterprises watershed times are at hand. The 'pleasures' of increased profitability, smaller workforces, market focus and the comments by many firms that their most important resource is their employees are more than offset, especially in large firms, by the 'pain' of continued layoffs, minimal capital investment, little employee trust or loyalty, and only moderate improvements in production capability and technology."

And her views were confirmed in a recent **New York Times** article (26 September 1995) reporting on the break-up of the AT&T lab, due to diminishing corporate interest on the brilliant breakthrough discoveries that might lead to an entirely new generation of products.

The question facing us as Members of Congress is how to ensure our country's leadership in the development of innovative technologies for future generations. I believe that we can adjust macroeconomic policies to make it easier for companies to bring products to market. I also believe there is a vital role for public/private partnerships in high-risk, long-term technology development. As we begin this series of hearings, I hope that we move beyond the prejudice of political ideology and thoroughly consider both direct and indirect government policies that support our continued technology-driven economic vitality.

I would also like to thank all of our witnesses for taking the time to appear before the Subcommittee today. I particularly want to commend the Office of Technology Assessment for their report on the R&D tax credit. They responded to a Congressional request quickly and under difficult circumstances.

Statement of Representative George E. Brown, Jr.
September 28, 1995

The wide array of government policy instruments that are the subject of this hearing today undoubtedly have an impact on the profitability of the many firms throughout our nation. Rational, cost-effective regulatory policies, low tax burdens, and sensible legal reform are goals we can all agree on. I am certain that the industry representatives who appear before the Subcommittee today will roundly endorse these concepts.

The important question for the Science Committee to consider, however, is not confined to the consideration of short term corporate profitability. The question is, will improvements in regulatory, legal, and tax policy substitute for government programs that directly support research and development? I know of no substantive analyses that suggest these government policies are substitutable. To suggest that these reforms, especially in the forms they have been presented in this Congress, will substitute for direct government expenditures to support research and development is pure speculation. The pressure of the market place has always been too great to allow firms to invest the resources needed to undertake long term, high risk research and development.

The Chairman continues to insist that government support for basic research is maintained because NSF and NIH have emerged from the budget battles unscathed. It is only programs such as ATP, now re-labelled "corporate welfare", that have been eliminated in the name of fiscal responsibility and excessive government intervention into industry decision-making. The anti-government rhetoric which has grown to a frenzied pitch would lead one to believe that the federal government has done nothing but stand in the way of American business. A CRS report released in April of this year identified 177 federal programs which benefit businesses through grants, direct payments, direct loans, insurance, and loan guarantees. CBO released a study in July of 1995 estimating federal expenditures to promote business and commerce of $27.9 billion through spending programs, credit programs, and favorable tax treatment. And what has been the result of this? An economy that has been rated the most competitive in the world and one which continues to provide the highest standard of living to its citizens.

I do not suggest that we cannot do better. We can. Government can be a more constructive partner to industry, and it should be. However, I fail to see how narrowing the base of government support for research and development will assist us in maintaining our standard of living. Optimism alone will not result in development of future products and processes. We should not be sacrificing our future options by dismantling our research and development infrastructure.

Mr. WALKER. Well, I'm very pleased to have an opportunity to participate in this hearing with Mrs. Morella and with her constituents.

I think this dialogue should be very interesting, and I appreciate the opportunity to be here.

The difference between rich and poor nations is not that the rich have more money than the poor ones, but that rich nations produce more goods and services.

One reason they do so is that their technology is superior. Technology is what Dr. Joel Moykr of Northwestern University calls "the lever of our riches." It is a cost-reducing, output-augmenting change in the application of knowledge that, in a sense, provides us with a free or very cheap lunch.

That is, technology leverages our resources such that we can achieve an increase in output that outweighs the increase in cost and the effort to bring it about. Technological creativity has been the engine of our economic growth. It is at the very base of America's greatness. And it's the very base of our future.

All over America, scientists and entrepreneurs are working toward a better and brighter future. Spectacular breakthroughs in computers, electronics, molecular medicine, materials, microminiaturization, artificial intelligence and virtual reality will change forever the way we communicate, learn, work and live.

Throughout this country, corporations are re-engineering to produce more and better products and services with fewer resources, and less waste and adverse impact on our environment.

Our private sector is reacting swiftly and decisively to changes in the economy and innovations in the marketplace.

Yet, government is the least changed major institution in America. Government today works on the same philosophy as Henry Ford's Model T—"you can have any color you want, as long as it's black."

This uniform, one-size-fits-all policy, has long been superseded by contemporary business practices.

It is an appalling situation in which, for some of our most important functions of government, we continue to buy vacuum tubes in an age when 3.1 million vacuum tubes can be put on this Intel chip.

There is something perverse about a government that is still operating in the mid-20th century as we move toward the 21st century.

It is that philosophy that extends itself into the totality of our economic decision-making, which is, I think, a problem for our future.

We cannot prepare for the future by clinging to the past. We can have a leaner, better, more efficient government—one that does more and serves people better with fewer resources. We can have a government that rewards individual achievement, self- reliance, a willingness to accept risk, and a propensity for change.

We can have an environment with less regulation, less litigation, less red tape, less centralized bureaucratic micro-management.

We can have an incentive structure that stimulates investment and rewards an entrepreneurial spirit. We can have a government

that puts a premium on creativity, diversity, and the ability of free people to invent new ways of solving problems.

We can do all those things. All we need is the will to succeed and the courage to begin.

I want to thank our Subcommittee Chair, Mrs. Morella, for initiating this vitally important examination of the impact of government policies on technological development and our economic competitiveness.

I also wish to thank our witnesses today for coming to Washington to help us gain more knowledge in what we need to do in a macro-economic sense to assure a bright and competitive scientific and technological future.

Mrs. MORELLA. Thank you, Chairman Walker, and I appreciate you coming to the Subcommittee hearing. I know you're here because this is an issue that's of great importance to you.

It gives me great pleasure to now recognize the Ranking Member of this Committee, the distinguished gentleman from Tennessee, Mr. Tanner.

Mr. TANNER. Thank you, Madam Chairman. I too am pleased to participate in this hearing. I welcome the discussion.

I agree that we need drastic changes in our macro-policies. All regulatory, tax and legal policies that have been a hindrance to business need to be examined, looked at, and changed for the better.

But what troubles me is the way the debate has been framed here. And the debate, in our view, has been framed in such a way to draw the conclusion that if we make these changes in macro-economic policy, then we can draconianally and drastically cut federal support for technology development and commercialization programs that are known as blue-sky research or long-term, high-risk research and development programs that we don't believe there's going to be sufficient support in the marketplace alone to keep this country competitive.

The Chairman has stated—Chairman Walker—we have people who suggest in Congress that because we have all of the bad policies at the macro-economic level, then we ought to come up with all kinds of government spending to supplement business' inability to compete.

Let's change macro-economic policies, continuing to quote. Let's make structural changes in regulation, taxation, and litigation, and then you can get rid of some of the superfluous superstructure that the government has that supposedly makes our companies more competitive.

There's nothing wrong with that statement, insofar as it goes. We should cut programs that don't work and develop a plan that will effectively allow our companies to promote technology development, and so forth.

What we should not do is to blindly terminate long-term research and development projects that the government is participating in with industry that would otherwise not be done by industry in this country.

There's an article in The New York Times of September the 26th about the Bell Laboratories and this, I think, frames this debate, or the way I want to see it go.

Scientists at AT&T, Bell Laboratories, once practiced a researcher's dream, following their own curiosity, while another department decided whether and how to commercialize their discoveries. With the break-up of AT&T, the dream is over.

This is a far cry from the mission of Bell Labs when it was regarded as the jewel of American industrial research. For many years, it was almost the only industry lab in the United States with a large program of long-term basic research out of which flowed many fundamental discoveries from the transistor to the universe microwave background.

The turning away from long-term research, however, is not the folly of short-sighted business managers, but a rational adaptation to profound changes in the climate of industrial science, say several leading exerts on telecommunications research.

The computer and telecommunications business is fast- moving, highly competitive, and increasingly dominated by companies that are narrowly focused. This has prompted companies to specialize, as is evidenced in the rationale for the AT&T break-up.

The consequence has been a diminishing corporate interest in the brilliant breakthrough discovery that might lead to an entirely new product.

That's what I want us to think about as we go through in what we all agree is a good exercise in examining these macro-economic policies. But I don't think we're going to give, unless we raise the flag, enough attention to the vital role that government must play in long-term, high-risk research and development.

Thank you.

Mrs. MORELLA. Thank you very much, Mr. Tanner. I'd now like to recognize for any opening comments he may have, the Ranking Member of the Full Committee, Mr. Brown.

Mr. BROWN. I thank the gentlelady for recognizing me and also for focusing the Subcommittee on this very important topic. And I ask unanimous consent that my statement be printed in the record at this point.

Mrs. MORELLA. Without objection, it is so ordered.

Mr. BROWN. I would just like to make sort of a general comment, that underlying the details of what we're doing here at this hearing is a problem that has engaged the leaders of human societies for several thousand years.

And that is the proper role of government in terms of producing a healthy and productive society.

The distinguished Ranking Minority Member of this Subcommittee made reference to draconian activities. It was the great Greek leader Dracon who represented the role that the Democrats are supposedly playing today. That is, a highly restrictive and punitive government.

His version of the way to rule the Greeks was to increase the death penalty and to increase the amount of regulations on the society. He was succeeded a couple of hundred years later by another great leader, Solan, who went the opposite direction.

The tensions were the same ones that we're debating today—what is the proper role of government? Solan reduced taxes and released the regulations on the Greek peasants, and that made for a more productive society.

Now the point that I wish to make here is that there are two polar extremes, and the proper answer is somewhere in the middle, and each society has to find it for itself. So we're engaged here today in trying to find that proper balance.

I hope we will reject the idea that you can develop a good society by minute regulation and oppressive taxes. That will not work. Likewise, I hope we reject the idea that you can eliminate all taxes and regulations and have a perfect society. That doesn't work, either.

So let's look for the finding somewhere in the middle ground, what the Greeks called the golden mean, as a way of achieving the kind of society that we want. Can you quote Shakespeare on this, too?

[Laughter.]

Mrs. MORELLA. No, but I could quote Fielding, who said, "Damn those Ancients. They've stolen my thoughts."

[Laughter.]

And as you went back to Dracon and Solan, we are all aspiring toward that proper balance. And I thank you, Mr. Brown. Ms. McCarthy, from Missouri, I'd like to recognize her.

Ms. MCCARTHY. Thank you, Madam Chair. I reserve my comments because we have such an impressive group of panelists to come before us today and I am anxious to get on with the business of finding that common ground so eloquently spoken of.

Mrs. MORELLA. Thank you. So you can see, this is a very efficient Subcommittee.

I would now like to, on the first panel, recognize Mr. Philip Howard, again, the author of the best-selling book on "The Death of Common Sense," interestingly enough, an attorney himself.

Mr. Howard?

STATEMENTS OF PHILIP K. HOWARD, HOWARD, DARBY & LEVIN, NEW YORK, NEW YORK; AUTHOR OF "THE DEATH OF COMMON SENSE"; AND ALLAN I. MENDELOWITZ, PH.D., MANAGING DIRECTOR, INTERNATIONAL TRADE, FINANCE AND COMPETITIVENESS, GENERAL ACCOUNTING OFFICE, WASHINGTON, D.C.

Mr. HOWARD. Thank you, Madam Chairwoman. I'm honored to be here this morning. I also have a deep respect for the role of technology in our society because the most important part of my education was working in Mr. Tanner's state at the Oak Ridge National Laboratory for three summers, where I had the privilege of working with several Nobel Prize Winners, who taught me a number of things, including that complex problems often have simple answers and the values of individual intuition and thought in the creation of the most wonderful things.

We are here, presumably, unlike other committees addressing very difficult problems in our society, not to bemoan the loss of technology in our country, but to celebrate its importance and to consider the conditions for its future survival.

It is obviously the keystone of our economy today. The computer software industry, communications, health care, aeronautics, down the line, our leading industry are technologically-based.

The regulatory burden in fact has not been great on these industries. The burden that is often debated are regulations that I think most people agree are needed, like environmental regulations or worker safety regulations, that affect industries that are not high-tech industries, for the most part. And I'm happy to say that there are many improvements underway in those areas.

But law and regulation have not adjusted to the changing needs of technology. And at the end, I'd like to make a comment that the country itself is losing in its preoccupation with technology and the joys of present communication, is well on its way to losing the human base that made possible the technological growth that we now have.

First, I'd like to talk about very specific problems affecting the technological industries today.

There is a widespread perception that we don't have a coherent antitrust policy for technology. In the past, and I've done a lot of antitrust work professionally, the common ground of most antitrust cases has been that the consumer has been hurt by consolidations or other activities, price-fixing and the like, which large businesses have engaged in.

Today, there is a tendency to attack consolidations, but often in the context of consolidations which lead directly to greater availability of products and lower prices.

The last decade has shown, I think without doubt, that market power is a very fragile thing indeed when you're talking about the computer and software industry in particular, and where the main barrier to entry is consumer goodwill and market acceptance.

And in that context, I believe it would be worthwhile for Congress to look at, and for the Administration to reconsider, what antitrust policy should be in certain technological industries.

The second matter of extreme importance to industries, particularly in the consumer and software fields, is intellectual property.

The rules that govern copyright and patent are outdated. The standards don't easily apply to intellectual property. There are abuses going in both directions, where companies take prior art, change it a little and then demand copyright protection. And in the other direction, where companies steal without embarrassment new art and then, because of the way the laws are written, pay a small price for doing so.

So I believe that a very important case is going to the Supreme Court. The Supreme Court agreed to take it yesterday, the Borland-Lotus case. But this is also an area where Congress needs to develop new standards, acknowledging that the ultimate judgments will be human-based because there are very complicated.

You can't write rules that will say exactly how it will work. But even acknowledging that human judgment will require to make these judgments, we need new standards in this area to acknowledge the change in the nature of the products being developed.

The third area is that government itself has often led technology through its own contacting, whether it's defense contracting or other forms of contracting.

The government contracting rules today make it not the leader in developing new technology, with a few exceptions, but the follower in technology. The rigidity of the federal acquisitions regula-

tions, where, in summary, you have to develop all the specifications in advance. Then, after years of that, you bid it out. And this system that assumes that you have to treat every bidder the same, precludes the give and take among members of industry that would be necessary, and is necessary, not only for avoiding the waste of money, but also coming up with technologically innovative products.

Last year, the FAA, under an exemption granted by Congress, put in a line at the encouragement of the Administration in a contract for transceivers, in which they said they had all the detailed specifications written in stone the way they usually are. And then they said, and if you have any better ideas, let us know. This is not permitted under the federal acquisitions regulations.

Someone came in and said, I think I could do the same job with a different kind of machine at much lower price. And sure enough, they came in with a machine that did the same job at 28 percent of the cost.

That's the sort of thing that we're missing out on at DOD and everywhere else every day because of the rigidity of the system, again. And one of the side costs of that is that government can't lead in what Mr. Tanner was saying it should be leading, which is innovation, which it has always had in this century an important role in doing.

There was a reference to litigation and fear. Again, this is not a big issue in the computer and software industry. It's a huge issue in the health care industry and somewhere in aeronautics.

When there's no institution in the country who views it as their job to safeguard the reasonableness of decisions made by people, any innovation is an invitation to liability because every positive human act involves risk. In fact, I would say that risk is half of life.

And we have a system now where if there is a risk and it doesn't work out, you can be sued and generally be held liable because judges in courts don't view it as their role to safeguard reasonableness. They throw everything at the jury.

We need tort reform and we need a coherent national policy as to what it means to safeguard the reasonableness of decisions made by people on the spot.

The system is out of control, not because we have that much more litigation. It's because no one making decisions on the spot—not business, not doctors engaging in deciding whether to do a test—has any confidence that the institutions of our government will protect them in the inevitable circumstance that things don't work out some of the time.

It's a very important priority which I think has been—I'm sorry that the debate has taken the heat it has in the last year, and I think it's focused on the wrong issues. But it's very important for the future of innovation in this country.

The last point I'd like to make is that technology and technological innovation came out of a country where mothers told their children that what they thought was important and who they became depended on how hard they worked, how hard they studied, and whatever God gave them.

It was a country where our math scores were not necessarily the highest in the western world, but they were pretty good. It was a country where schools were under control, where teachers could maintain discipline in the classrooms.

That America, as we all know, is rapidly eroding. We no longer believe that children should be and can be what they want to be. In fact, if the child grows up to be a teacher, we tell that teacher that she or he doesn't have control, shouldn't be able to use their own judgment to control the classroom.

Instead, they have to comply with books of forms whenever they want to discipline an unruly student, as one example.

If you want to start a business, you often fill out 100 forms and then you're told to put in a wheelchair ramp or something else that you know you don't need, that you know will affect the bottom line. But there's no one in government or anyone who has the authority to say, no, you don't need to do that because that's not reasonable in the circumstance.

We're creating a society where increasingly, it is hard to fulfill the American dream.

And how far this has gone was revealed to me the other day when I talked with a person called Reverend Steven Chilan, who is the head of the Episcopal Mission Society, which runs social programs in inner cities around the country.

He said that he had noticed a change in adolescent children in the last decade that he had never noticed before. They now believe, he said—it's particularly true—he said it started with inner- city children, but it's true with adolescents, generally. They increasingly believe that what they think doesn't matter, that life will be outside their control, governed by outside forces.

And in a world of homogenized culture given to us by technology, one of the side costs has been, in a world where rulebooks tell everyone exactly what to do, teachers how to run their classrooms, increasingly, we are breeding an environment where technology can't be invented because our children don't think that what they think will be important.

So, ultimately, the long-term threat of our technological base is that we're not creating an environment for people to keep it going.

Thank you.

Mrs. MORELLA. Thank you very much. You synthesized that really quite well, with a number of major points. And we'll get back to you for some questioning, Mr. Howard.

I'd now like to recognize Dr. Allan Mendelowitz, from GAO, for his testimony.

Dr. MENDELOWITZ. Thank you very much. With your permission, I'll submit my statement for the record and make a few brief oral comments.

Mrs. MORELLA. Without objection, so ordered.

Dr. MENDELOWITZ. The competitiveness of a nation is measured by the extent to which the people of that nation are able to enjoy a rising standard of living over time, where we acknowledge that the measure of standard of living must be a multi- dimensional measuring, using different indices, in addition to just GNP per capita.

The stagnating standard of living for many in this country has become central to the current debate over the government and the economy. And it's important to focus on that issue because it has a lot to do with, I think, the discontent and concerns that people have out there.

Over the long-run, what determines standard of living is pretty clear and probably immutable, and that is the productivity of the country. If you have rising productivity, it supports higher wages. Higher wages support a higher standard of living.

Without that increase in productivity, you cannot sustain over the long run a rising standard of living.

The ways in which you can increase productivity and standard of living are fairly clear and limited. You can invest more and increase the stock of capital. And GAO has reported quite vigorously on the impact of the budget deficit on the ability of this country to invest in the problems associated with government crowding out private-sector savings and investment.

You can invest in better capital and develop new products and rely on technology to increase the productivity of capital and the products available to consumers.

We did a recent report for this Committee which looked at the benefits of the manufacturing extension program in aiding the productivity and competitiveness of small- and medium-sized firms in overcoming access to information barriers and acquiring better technology in the manufacturing processes.

You can have a better work force, which represents a better trained and better educated work force, which can be more productive because of the human capital embodied in those workers. And the private sector can manage itself better.

The most widely requested report in the history of the General Accounting Office is a report we issued about four years ago on the contribution of total quality management to corporate competitiveness. Over 75,000 copies of that report were requested by the public.

I don't think there's a report that was ever requested, even at half the volume of that 75,000.

Now the government, the presence of the government or the absence of the government, affects all of the above, and society's efficient use of resources. By imposing costs and changing incentives in pursuit of public policy objectives, government affects the productivity and the standard of living of the country.

What distinguishes regulation from government expenditure programs is the degree to which costs are considered when regulatory objectives are established and efforts are made to achieve them.

Congress is currently struggling with ways to deal with the budget deficit and reach a balanced budget over the next seven years.

The costs of expenditure programs are clearly seen because taxes come into the Treasury and expenditures go out.

Regulation, when used to achieve public policy objectives, also imposes costs on the economy in pursuit of the public policy objectives in goods that are desired.

But regulation, in a sense, represents an escape from the budget constraint. There is no equivalent pressure to reduce the cost of

regulation comparable to the current efforts to deal with the budget deficit associated with government expenditure programs.

High costs are imposed in the form of additional costs on society, disincentives with respect to desirable and efficient behavior on the part of the private sector.

Without focusing on the costs associated with regulation, we run the risk that government and regulatory activity blunts incentives to innovate, imposes excessive costs in the pursuit of public policy objectives, lowers efficiency in the economy and adversely affects the standard of living.

In these undertakings, it's essential that the government carefully consider the impact of its actions on productivity, efficient use of resources in the economy and ultimately, a standard of living in the American people because the impact is as direct and as significant as any of the direct expenditure programs the government has.

Thank you.

[The prepared statement of Dr. Mendelowitz follows:]

U.S. COMPETITIVENESS: ASSESSING THE IMPACT OF GOVERNMENT ACTIVITIES ON PRODUCTIVITY AND LIVING STANDARDS

SUMMARY OF STATEMENT BY ALLAN I. MENDELOWITZ, MANAGING DIRECTOR
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GENERAL GOVERNMENT DIVISION

Since World War II, the U.S. economy has been transformed by technological and global political and economic changes that have presented opportunities and challenges for businesses, workers, and the government. The ability of the U.S. economy to meet the challenges of these transformations has been subsumed collectively under the popular label of "competitiveness."

The competitiveness of a nation has been defined as its ability to sustain a high and rising standard of living for its citizens in a complex world environment. A nation's competitiveness is determined primarily by productivity growth that allows workers to earn increased wages. Several factors determine productivity, such as the stock of capital, the level of technology, the quality of the workforce, and the quality of management. Private businesses and households, guided by market forces, make the decisions regarding these factors. These decisions are influenced by government laws, regulations, and programs at the federal, state, and local levels.

Today's testimony addresses GAO work both completed and ongoing concerning the impact of government activities on the economy and living standards. The stagnating standard of living for many Americans is a central issue in the current debate over government activities. As such, it is essential that government carefully consider the impact of its actions on productivity and living standards.

Chairwoman Morella and Members of the Subcommittee:

I am pleased to be here today to testify before this Subcommittee on U.S. competitiveness and the impact of government activities on living standards and the economy. Since World War II, the U.S. economy has been transformed by technological and global political and economic changes that have presented opportunities and challenges for businesses, workers, and the government. The United States experienced rapid economic growth during the early part of this period, with significant increases in real incomes and productivity. However, during the last 2 decades, the United States experienced slower productivity growth, declines in real wages, and stagnating median family incomes, as currently measured. For example, Bureau of Census data show real median money income for families in 1993 was essentially the same as its 1973 level.

In the face of these transformations of the U.S. economy, government officials, business leaders, and academic experts have been concerned about the appropriate role of government and the extent to which government hampers or assists private sector responses to changes in the economy. The ability of the U.S. economy to meet the challenges of these transformations has been subsumed collectively under the popular label of "competitiveness." We are all familiar with discussing the competitiveness of a firm in terms of its ability to gain market share while earning adequate returns. In contrast, the competitiveness of a nation has been

defined as its ability to sustain a high and rising standard of living for its citizens in a complex world environment. A nation's competitiveness is determined primarily by productivity growth that allows workers to earn increased wages.

A variety of factors determine productivity, such as the stock of capital, the level of technology, the quality of the workforce, and the quality of management. Private businesses and households, guided by market forces, make the decisions regarding these factors. These decisions are influenced by government laws, regulations, and programs at the federal, state, and local levels. Government activities include tax policies; education and training programs; technology policies; trade, health, and safety regulation; macroeconomic policies; and infrastructure investment, among others. Establishing the proper scope for government activities and ensuring efficient government performance is critical if the government is to contribute to, rather than detract from, improvements in living standards.

In today's tight budget environment, Congress is looking carefully at the need and justification for government programs and policies. Additionally, Congress is reviewing the appropriateness of government regulations that can affect productivity and living standards. As such, the relationship between changes in government programs and policies and the competitiveness of the United States is of heightened concern. In assessing the impact of changes in

governmental activities on productivity and living standards, there are several issues to be considered.

-- What are the goals of government policies and programs?

-- Are these goals consistent with the competitiveness goals of improving productivity and living standards?

-- Are there opportunities to alter programs and policies to increase their cost-effectiveness, improve the ratio of benefits to costs, and increase their contribution to improvements in productivity and living standards?

Clearly, these questions are Congress' prerogative and central to the political debate of the country. In my statement today, I will provide information related to the last two questions, basing my remarks on GAO work both completed and ongoing concerning the impact of government activities on the economy and living standards.

THE DEFINITION OF COMPETITIVENESS HAS EVOLVED

Over the last 20 years, the issue of U.S. competitiveness has evolved from comparisons of U.S. export market shares to a broader emphasis on the determinants of productivity growth and improvements in living standards. The shift in the definition of

competitiveness in the United States can be traced in the presidential and government commission reports on competitiveness and in the interest of Congress.

The competitiveness report President Carter submitted to Congress defined competitiveness in terms of the ability of U.S. exporters to compete in world markets.[1] The study concluded that increasing supplies of human and capital resources and expanding technological capabilities in other nations relative to the United States were the sources of the increased competition facing U.S. producers. In 1985, the commission established by President Reagan defined competitiveness as the "degree to which a nation can, under free and fair market conditions, produce goods and services that meet the test of international markets while simultaneously maintaining or expanding the real incomes of its citizens."[2] The commission found that competitiveness was not a zero-sum game for the world and that all nations can benefit together as the world economy grows. Also, it said that competitiveness was not an end in itself, but a means to achieving higher living standards and increasing wealth.

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[1]Report of the President on U.S. Competitiveness, Together with the Study on U.S. Competitiveness, Transmitted to the Congress, September 9, 1980 (Washington, D.C.: U.S. Department of Labor, Office of Foreign Economic Research).

[2]Global Competition: The New Reality, The Report of the President's Commission on Industrial Competitiveness (Washington, D.C.: Jan. 25, 1985).

The Competitiveness Policy Council, established by Congress,[3] defined competitiveness as the "ability to produce goods and services that meet the test of international markets while our citizens earn a standard of living that is both rising and sustainable over the long run."[4] The council found that strengthening U.S. competitiveness required a focus on domestic problems to improve the U.S.' economic health and concluded that productivity growth is essential to long-term improvements in living standards. Businesses, especially in industrialized nations, need to increase productivity to remain competitive in the global marketplace, and workers need increased productivity in order to command higher real wages and living standards.

The definition of competitiveness focused on living standards has not been adopted in all studies. The World Economic Forum, of Lausanne, Switzerland, defines competitiveness as the "ability of a country or a company to, proportionally, generate more wealth than its competitors in world markets." The forum has reported that the United States has regained its place as the most competitive economy in the world for the first time since 1985.[5] While the

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[3]Congress established the Competitiveness Policy Council in the 1988 Omnibus Trade and Competitiveness Act (Public Law 100-418, Aug. 23, 1988), as amended by the Customs and Trade Act of 1990 (Public Law 101-382, Aug. 20, 1990).

[4]Building a Competitive America, First Annual Report to the President and Congress, Competitiveness Policy Council (Washington, D.C.: Mar. 1, 1992).

[5]World Economic Forum, The World Competitiveness Report: 1994 (Lausanne, Switzerland: IMD International, Sept. 1994).

forum includes measures related to productivity achievement in its evaluation, it concentrates on whether a nation's environment is conducive or detrimental to the domestic and global competitiveness of firms operating in the nation, as opposed to concentrated on the living standards of its citizens.

The linkage between the competitiveness of firms and industries to that of a nation is not always a simple one. At the industry or firm level, competitiveness refers to the ability of particular firms to sell products while providing an adequate return on resources employed by the firms. While technological change or trade liberalization can create expanded opportunities for specific firms and industries, it may at the same time force other firms or industries out of business. In this context, some firms or industries experienced "competitiveness" gains while other experienced losses. Yet advances in living standards have historically been tied to technological progress and market expansion. Thus, national competitiveness may be advanced even while some firms or industries may see a decline in their competitiveness.

We recognize the interest of Congress in identifying the impact of government activities on the nation's competitiveness. We have defined "competitiveness" as the ability of the nation to achieve a high and rising standard of living in a complex world environment. We chose not to include an international market test because that

might lead to a focus on exports as a primary test of competitiveness. Although exports are important, their relationship to living standards can be ambiguous. For example, a country could increase its exports by adopting fiscal or monetary policies--such as currency devaluation--that would lower its population's living standards. Instead, the focus of analysis should be on the standard of living achieved for U.S. citizens.

IMPACT OF GOVERNMENT ON THE ECONOMY

We have increasingly sought to report on how government activities affect the economy and, ultimately the standard of living. We use a diverse set of measures of the standard of living, as no one indicator can give a full picture of how well businesses and individuals are faring. The evidence from the evolution of the competitiveness issue suggests that living standards can only be advanced if U.S. productivity growth increases. This can be accomplished with more capital, better technology, a higher quality workforce, improved management, and a government whose activities have a positive impact on these factors. In our work on competitiveness, we take a broad orientation in assessing government operations to see their bottom-line impact on the economy. In several areas we have sought to specifically link government performance to competitiveness issues, reviewing the efficiency of government operations and identifying adverse consequences of government activities.

More Capital

Economic growth--which is central to almost all our major concerns as a society--requires investment, which, over the longer term, depends on saving.[6] The surest way to increase the resources available for investment is to increase national saving, and the surest way to increase national saving is to reduce the federal deficit. Some progress has been made on deficit reduction, but the long-term deficit outlook remains a pressing national problem. Not taking additional action to reduce deficits remains an unsustainable approach in the long term.

Nonfederal saving[7] has declined since the 1970s, while federal budget deficits have consumed increased levels of these scarce savings. The result has been to decrease the amount of national saving potentially available for investment.[8] These conditions--lower nonfederal saving and the large share of this saving absorbed by government deficits--do not bode well for the nation's future productive capacity and future generations' standard of living.

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[6]See Budget Policy: Prompt Action Necessary to Avert Long-Term Damage to the Economy (GAO/OCG-92-2, June 5, 1992); and The Deficit and the Economy: An Update of Long-Term Simulations (GAO/AIMD/OCE-95-119, Apr. 26, 1995).

[7]Nonfederal saving consists of the savings of state and local governments and the private sector.

[8]The depressing effect of deficits on growth might have been mitigated had they financed higher levels of public investment. However, as we noted in our June 1992 report, this is not what happened.

Recently, the Comptroller General testified that continuing large deficits pose significant long-term economic and fiscal consequences for our nation.[9] The aging of America's population threatens to convert today's fiscal commitments into economically unsustainable burdens that may very well undermine the future economic well-being of the nation. Conversely, shifting fiscal policy paths to eliminate these deficits promises to increase the future capacity of the U.S. economy to provide for both the retirement of the baby boom generation and the rising standard of living for the next generation of workers. In addition to the overall level of government deficit or surplus, the proportion of the budget devoted to investment spending will also affect long-term growth. If public resources are devoted to investments that enhance private sector productivity growth, then they will contribute to rising future living standards.[10]

One area of public investment is for infrastructure to move people, goods, and information that U.S. business depends on. Currently, we are studying the link between government investment in transportation infrastructure and competitiveness, including private sector productivity. Infrastructure improvements, for

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[9]See Deficit Reduction: Opportunities to Address Long-Standing Government Performance Issues (GAO/T-OCG-95-6, Sept. 13, 1995).

[10]Given the need to reduce the budget deficit, however, decisions to raise future levels of public investment should be made within an overall fiscal policy emphasizing deficit reduction. This point is discussed at greater length in Federal Budget: Choosing Public Investment Programs (GAO/AIMD-93-25, July 23, 1993) and Investment (GAO/OCG-93-2TR, December 1992).

example, enable businesses to employ just-in-time inventory systems, achieve economies of scale, and have access to a larger labor market.

Better Technology

Improved technology is an important contributor to productivity growth and improvements in the standard of living. Historically, the government has been an important source of research and development activities in the United States. However, the direct linkage between specific government programs and productivity improvements has been difficult to establish. GAO has a number of efforts underway to address this linkage. For example, we recently reported on a GAO survey of manufacturers that had received services from manufacturing extension programs (MEP).[11] About 73 percent of the respondents to our questionnaire said that they believed that the MEP assistance in the diffusion of technology had positively affected their overall business performance, and most also believed that it positively affected the productivity of their workers.[12]

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[11]Manufacturing extension programs are state/federal partnerships that offer manufacturers assistance in modernizing or upgrading their operations.

[12]See Manufacturing Extension Programs: Manufacturers' Views of Services (GAO/GGD-95-216BR, Aug. 7, 1995). In our pretests of the survey, we found that firms were unable to provide quantifiable data on the effect of the service received on other aspects of their business, however, such as changes in productivity, profits, or sales.

In addition to providing these kinds of indicators at the level of the firm, we are also reviewing the extent to which analyses have been able to link government technology programs and productivity. However, the impacts of technology programs are particularly difficult to measure. For example, the technologies may not result in benefits for a number of years after the funding, and some of those benefits may also be captured by firms other than those that received the government funding.

Workforce Quality

Education and training have traditionally been provided by state and local governments, with a limited federal role. Many federally funded employment training programs are designed to assist the unemployed, enhance skills or employability of workers, and create employment opportunities.[13] However, little is known about the effectiveness of these programs. Some programs do not meet the needs of job seekers, providing only limited services that may not match the labor market needs. Most of the administering agencies cannot say if the programs are actually helping people to find jobs.[14]

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[13]The federal government has 163 separate employment training programs scattered across 15 departments and agencies and 40 interdepartmental offices, which in turn channel funds to state and local program administrators.

[14]See Multiple Employment Training Programs: Major Overhaul Needed to Reduce Costs, Streamline the Bureaucracy, and Improve Results (GAO/T-HEHS-95-53, Jan. 10, 1995).

Better Management

Productivity also can advance with improvements in management. Achieving high levels of quality has become an increasingly important element in corporate success. Our 1991 review of 20 companies that were among the highest-scoring applicants in 1988 and 1989 for the Malcolm Baldrige National Quality Award[15] indicated that companies that adopted quality management practices experienced an overall improvement in corporate performance.[16] In nearly all cases, companies that used total quality management practices achieved better employee relations, higher productivity, greater customer satisfaction, increased market share, and improved profitability.

CONCLUSION

Competitiveness is one of the most important issues affecting the United States. The stagnating standard of living for many Americans is a central issue in the current debate over government activities. As such, it is essential that government carefully consider the impact of its actions on productivity and living

[15]The most widely accepted formal definition of what constitutes a total quality management company exists in the criteria for the Malcolm Baldrige National Quality Award. This annual award, given by the U.S. Commerce Department since 1988, recognizes U.S. companies that excel in quality achievement and quality management.

[16]See Management Practices: U.S. Companies Improve Performance Through Quality Efforts (GAO/NSIAD-91-190, May 2, 1991).

standards. In assessing impacts, it is important to look at what cannot be quantified as well as what can be quantified. While we recognize that it is difficult to quantify the impact of government activities on competitiveness, the discipline imposed by an approach that focuses on assessing the impact of government activities, rather than just on considering the cost of government operations, may help to ensure that the government activities contribute to, rather than detract from, competitiveness.

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Chairwoman Morella, this concludes my prepared statement. I will be pleased to try to answer any questions you or the Subcommittee may have.

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Mrs. MORELLA. Thank you very much, Dr. Mendelowitz. And now we'll go on to our round of questioning.

We have been joined by two other members of the Majority side here. But I think I'll progress, then, with some opening questions that we may have here.

For Mr. Howard. You talk about creating the proper environment with regard to reasonableness. And I read some critiques of your book and I scanned your book. It's almost like you are in an ideal situation where we can always rely on the reasonableness of people, devoid of any greed, devoid of any of the conflicting problems associated with individualism and different environments.

I don't know how—maybe you'd like to make some comments about how you think we can arrive at that point. You talk about flexibility. We should rely on someone being able to make these decisions .

Maybe you'd like to comment a little more about the practicality of it. I know you use a lot of wonderful anecdotal situations.

Mr. HOWARD. It's a very fair question.

The law was never a set of rules that told people how to do things. The law is a set of standards that set goals. One of the most important goals is to act as a reasonable person would in the circumstances. It's not very clear who decides, a court and a jury, if you caused your accident because you were negligent or not.

So that law's attention—the place where this has broken down the most are, I'd start with the courts.

Courts used to have two decision-makers—judges and juries. If someone came in 40 years ago and said, I spilled the hot coffee and I'd like $10 million, the judge, one part of the tension would have said, how did it happen? Well, I bought the coffee. I drove off and the coffee spilled. And McDonald's coffee is hotter than Burger King's. And he says, well, how much hotter? Well, ten degrees. How hot was it? 180 degrees.

And the judge at that point, being a judge, would have said, I boil water every morning in my home at 212 degrees, as do millions of other Americans. Many of us are foolish enough to take the risk of driving in a car with it. This is an ordinary risk of life. Case dismissed.

Because his role was not to be just a referee, letting any argument go to the jury, any claim go to the jury. His role was to be the judge and, among other things, to establish the boundaries of community mores as to how far a claim should go.

If I trip and sprain my finger and sue for $10 million for writer's block, he would throw it out because it's a stupid claim.

Judges don't do that any more. We've lost that tension, the tension between the role of the judge and the role of the jury.

Go to a safety inspector. A safety inspector comes in today to a factory. He's got 4000 OSHA rules. He can measure—no one complies. I'm sure that this hearing room, now that it's subject to OSHA, does not comply with it. No room in America complies with OSHA. There are too many rules.

So an inspector today can go into any factory, find a violation, write up the ticket, as they did in Judy's Bakery in Evanston last year and gave a $2500 fine for not having the warning sign for the

Clorox underneath the kitchen sink. They can write up any fine and hold you liable.

The way the system ought to work, and OSHA is changing in this regard. They're really working on it this year. Joe Deere, the head, is terribly embarrassed by that last incident. But the way it should work is that the inspector ought to come in and say, this is an unsafe condition and I want you to change it, for the following reasons. And the foreman then should have the right to say, it is not unsafe. We've never had an incident in 20 years. That's the way we do it here for the following reason.

They can have an argument. That's an ideal system. The presumption goes with the inspector.

But the foreman in the ideal system can always kick it upstairs and go up the ladder if he feels strongly enough about it because he can defend his own reasonableness.

Legal systems are tension. The head of the nursing home ought to be able to have an argument with the inspector. The inspector doesn't have absolute authority. He has authority, but not absolute.

So what you're looking for—every situation is different—is a system that allows the people on the spot to think, aspire to legal guidelines, and try to arrive at a reasonable result.

Mrs. MORELLA. It's interesting. I just wonder if your background as an attorney and in writing the book, how these two meshed. It seems to me—

Mr. HOWARD. I'm a really bad lawyer.

[Laughter.]

I've never had much respect for the law.

[Laughter.]

I always thought it was far too detailed and never came up with the right answer.

Mrs. MORELLA. Then do you think that the bills that the House passed with regard to legal reform are exemplary?

Mr. HOWARD. No, I don't, in the following regard. I was with the Speaker two nights ago for an hour and we talked about this. While I believe that litigation reform is important, ultimately, the reform should lie in the hearts and souls of the judges to take back the responsibility that they've given away.

By the way, the system we've created now is one in which its common thread is that everyone in authority looks outside themselves for the answer.

We talk about big values all the time, as people argue over right to life. What's important are little values, what you think makes sense in the circumstance.

What's happened is we've created a system where no one is allowed to do that. And I'm now going around talking to courts about this, saying, look in the mirror. You have to decide things. You are judges. Instead, their attitude is, who am I to judge? I say, you are the judges.

And in the case of tort reform, I think that the bills proposed last year would be very good with one amendment, which is a comma after the cap, whatever the cap is. Caps are very rigid. They're arbitrary. Caps don't make much sense, except to change the presumptions. And the comma ought to be, unless, in the interest of justice, the judge decides to waive the cap.

And if you have a cap, a comma in that phrase, all of a sudden, you flip the presumption way over from anything goes to the jury to exactly the opposite—nothing goes to the jury over that cap, except in the odd case.

And there are these cases all the time where it would be unfair to impose a cap. So that's how I would write the bill and that's what I proposed to the Speaker.

Mrs. MORELLA. Very interesting. So you really would not be placing much emphasis in general with regard to the courts on the jury. You'd really place it more with the judge.

Mr. HOWARD. Well, judges are gatekeepers. There are always gatekeepers. They allowed whatever reasonable people could disagree with to go to the jury.

But what reasonable people shouldn't, as defined by what we believe in our community today, shouldn't disagree with, they decide.

Mrs. MORELLA. I'm going to allow others to question you, but I wanted to ask Dr. Mendelowitz at least one question during this first round.

Dr. Mendelowitz, for better or worse, economists play an increasingly important role in shaping government policy. Is the economics profession, as a whole, taking more seriously the potential for adverse economic consequences that come from regulation? If you think so, is such an awareness finding its way into the advice that economists are giving policy-makers?

Dr. MENDELOWITZ. I think that the area of regulatory analysis and assessment is an area where the economics profession has both devoted a lot of good talent and effort, and I think has had a very positive impact over the years on government regulatory activity.

I went back and pulled out a GAO report that was issued almost 20 years ago, entitled, "Government Regulatory Activity—Justifications, Processes, Impacts, and Alternatives."

I looked through it and refreshed my memory, having worked on it that many years ago. I found it surprisingly fresh in terms of the types of issues that folks concerned about the impacts of regulations should look at.

So I think that if you look at the last major wave of regulatory reform in the late '70s and early '80s, when the Civil Aeronautics Board was eliminated and the price regulation of airlines was eliminated, when price regulation of trucking was eliminated, entry restrictions were removed, when, for example, EPA has innovated, recently experimenting with incentives and markets as a way of officially achieving environmental objectives, such as auctioning pollution rights and what are defined as sort of air bubbles, creating a national market in sulphur dioxide emissions for electric utilities.

So I think that the area of economic research on regulation is an area where I think economists have done a lot of good work and I think the impact over the years has been positive and beneficial.

I hope that, in the coming years, what economists have to say in this area will prove helpful in achieving the public policy objectives that Congress identifies and establishes in ways that are more efficient than currently.

Mrs. MORELLA. Thank you for your response. I also found it very interesting that the total quality management, GAO report, got

such high dissemination of material and interest. We'll get back to that later.

I'd like to now turn for questioning to the Chairman of the Committee, Mr. Walker.

Mr. WALKER. Thank you very much, Mrs. Morella. Mr. Howard, I was just going to add a note to the story that you told on the Clorox. I was at a Lion's Club earlier this week that was preparing to go out and sell food at a community fair. The president of the club said to the members, now make certain that when we get there that we have a bottle of Clorox in a bucket beside the stand. Somebody in the group said, why? And they said, well, because when the state health inspector comes by, he looks for the bottle of Clorox as proof that you're trying to keep the place clean.

[Laughter.]

What now occurs to me is they're probably in violation, though, because I'm sure they don't have a sign over the bottle of Clorox sitting beside the stand. It's a note of just how regulatory we've become in our society.

Dr. Mendelowitz, let me see if this is a right summation of what you said. I just want to make certain before I go on that this could sum, at least a portion of what you said in your statement.

The competitiveness needs to be measured by assessing the impact of government activities, not just the cost of government operations. Is that a fair way of looking at what you're saying?

Dr. MENDELOWITZ. Correct.

Mr. WALKER. And I think that makes a very, very important point, that government has impact well beyond whatever the budgetary decisions are that we may make here because so often, what we do is impose costs in the system that are arbitrary, capricious, and sometimes done with all the best intentions, but with all of the worst results.

And so I agree with your point there. I want to question you on something else, though.

I'm not certain that in this day and age, that productivity is the only measurement of whether or not we are succeeding. I think it is an important measurement. But in an industrial society, it was the principal measurement of whether or not you were succeeding.

But I would submit to you that value-added in the future may be just as important a measurement, if not a more important measurement, because the nature of information means that what you've got to do is figure out how to be not just productive, but how you add to the value of whatever you're doing within the economy. First of all, would you agree with that premise?

Dr. MENDELOWITZ. First of all, I would agree. But, secondly, I would say that there's actually probably no contradiction between what I'm trying to say and what you're trying to say.

The ultimate value when you talk about value-added is just another way of talking about how much value, how much productivity does a worker contribute. And so—

Mr. WALKER. So you're talking about productivity in a broader context than simply the measurement of the output of the company.

Dr. MENDELOWITZ. Yes.

Mr. WALKER. But isn't it the case, though, that regulation and litigation and, to some extent, taxation, has a more profound impact on making money out of a value-added kind of situation than it does even out of a productivity situation, a productivity measured in terms of the work of the company?

In large part, in my view, because what happens here is that companies can adapt their productive expertise in ways to overcome whatever society throws at them. But if they decide that what society has thrown at them cannot allow them to go to the value-added portion of all of this, then the totality of the society loses in big ways. Is that a rational summation?

Dr. MENDELOWITZ. If I could impose on your patience, I'd like to read a paragraph from an 18-year-old GAO report.

Mr. WALKER. Okay.

Dr. MENDELOWITZ. Where it says. The design of an effective regulatory process requires an understanding of the way in which decision-makers respond to the environments within which they function.

Firms are in business to make a profit. The profit motive is the driving force. And business firms are likely to respond to a regulatory regime by adapting to its systems of rewards and punishments.

Firms familiarize themselves with all the incentives and the levers of the regulatory process, and work within the system to their own benefit. Others in the regulatory process behave accordingly.

The incentives offered by a poorly designed regulatory process generate activities undertaken in self-interest that lead to an undesirable outcome. Undoubtedly, some firms and individuals make a conscious attempt to subvert the regulation, but much regulatory failure would exist without this type of behavior. The failures are more often the result of a poorly designed incentive structure. I think that's exactly the point that you're trying to get at.

Mr. WALKER. I think that makes a very good point. And the other side of that it is it's not only a poor incentive structure. It actually adds to disincentives.

Dr. MENDELOWITZ. That's correct.

Mr. WALKER. You create a series of disincentives. And with that, I'd like to go for a moment, if I could, to Mr. Howard.

I'm interested in "The Death of Common Sense." And the one thing that struck me in the book was the story of Mother Theresa trying to put a shelter for the homeless into New York City. And essentially, the disincentive was that she had to build an elevator that was, in her view, totally arbitrary and capricious. And no one in the entire government had the ability to waive the regulation so she could go ahead and spend her own money to do something good to help the homeless.

Mr. HOWARD. That's right. One of the tyrannies of the modern legal system is that the way we write it is that we don't write any flexibility or authority into it to make exceptions. Every rule—Aristotle talked about this. Every rule of any sort requires exceptions.

In going to the point of cost and complexity of regulations, the idea of a regulatory budget is obviously a good idea and one which, to a certain extent, has progressed under AGO's leadership in the

last decade. But there are two different components, and the Mother Theresa story gives both of them. One is the cost.

In that case, they were going to have to spend $100,000 to put in an elevator that no one was going to use, and so Mother Theresa gave up and wrote a letter saying she'd rather spend the money for soup and sandwiches.

The other point of that story was it took them two years in the first instance to get the approvals from the city, even though the mayor—to take these two abandoned city buildings, even though the mayor agreed with it and everyone agreed with the project, because no one had the authority to cut through the complexity of the process.

And what happened in this country, and it's happening with innovation in certain areas like agricultural innovation, for very good reasons, there are regulatory controls on what mad scientists can do in the fields and throwing out new pollens or the like, for the corn, because you don't want it to infect, some mad germ to infect the rest of the county.

On the other hand, there's a hodgepodge of regulation that's grown up with FDA, with the Agriculture Department, other departments, which make it practically impossible for anyone to do anything, not because the cost is great, but because the complexity is too great.

You can't even deal with making the rational economic decision because no one can go through the entire approval process.

And that's one of the principal virtues of simplification. It's not that we would get away with environmental laws or other things. It's that it allows people to make rational decisions which they can't make in an overly complex system.

Mr. WALKER. It seems to me that what we've done, in a lot of what we've done in tax policy, regulation policy, and litigation policy, is we've set up a system that really says that the reward for good behavior is no punishment. And that what we ought to have is a system that suggests that the reward for good behavior is success.

And that somewhere along the line, we have decided that taking all risk out, doing all these things, supposedly good things, have in fact created disincentives or the wrong incentives and so on, and that what we do is undermine success.

And in a competitive global economy, the worst thing that you can do to your society is suggest that you don't want people to be successful.

Mr. HOWARD. Right. We could clear out this room in about 30 seconds by talking about the philosophy of risk.

[Laughter.]

One expert has referred to this as a phenomenon of catastrophobia, where, instead of a country where we value doing what is sensible and making reasonable judgments and risk/reward, we value avoiding risk.

So everyone's digging foxholes all day long—doctors ordering tests that aren't needed and the like—because of what you're describing. A very important point.

Mr. WALKER. [presiding.] Excellent. I thank you. I thank you very much. Both of your testimonies are excellent, and I really ap-

preciate your taking the time to be with us today and providing us with the insight. I guess I'm in charge at the moment, and we'll go to Mr. Tanner next.

Mr. TANNER. Thank you, Mr. Chairman. I'd like to reserve my time and allow Ms. McCarthy to go first.

Mr. WALKER. I'd be happy to recognize Ms. McCarthy.

Ms. MCCARTHY. Thank you, Mr. Chairman. Thank you, Mr. Tanner.

Mr. Howard, I really appreciated your comments on legal reform, a key issue in this Congress and one we're still grappling with. I like the idea of the comma. I'm wondering if it shouldn't be a semicolon.

I think if we reflect on the EPA's experience with the Delaney Clause that calls for this zero tolerance, they went and sought judicial review to get out from under that and to seek a standard that was more reasonable. And they were held to the letter of the law.

So contemplate that a little bit and think about the responsibility on the lawmakers. And I'd like to take you now to that issue with regard to regulatory reform, another key legislative agenda item for us, and one which I don't think there's a member of this Subcommittee who does not want to do something in that area to make it approach that reasonableness that you talk about when you advocate giving more responsibility to the regulators and let them do the right thing. And then, as you said, safeguard their reasonableness of that decision.

Would you reflect on the reform effort in this Congress? I don't know how familiar you are with the legislation, but the process that we are putting in place with the legislation does envision a more structured process, more judicial review during the process of rule-making, and it's based on more extensive risk assessment and cost/benefit analysis.

Would you give us your thoughts on whether this approach that the current Congress is taking is the kind of procedure that will further remove the responsibility and the discretion away from the individual regulators.

And this whole concern we share today on technology development, will this kind of change make the rule-making process better for technology development or further impede it?

Mr. HOWARD. I believe that most of the proposals before Congress in the last year would replace Democratic micro-management by Republican micro- management and would be more or less equally ineffective.

I think that cost/benefit analysis is an important tool. I agree with that. I think that the idea of having rules come back to Congress for whatever it is, 60- to 90-day period, a very important idea.

It's Congress's responsibility. These agencies exist only because Congress doesn't have the expertise. If Congress doesn't like a rule, it should overturn the rule.

That's the job of the Congress of the United States. They shouldn't complain about the agencies. They ought to change the rules they don't like.

The idea of having cost/benefit analysis which people can then sue over so that the costs exceed the benefits, I think is not only

a little bit inconsistent with the idea of litigation reform, because everyone who doesn't like a rule will sue over that, but also, not mindful of the reality. The cost/benefit analysis always involves a value judgment.

And so what you want from the agencies is a coherent statement of what they view the costs and benefits are, and then see their value judgment.

But you cannot quantify the benefits of almost anything. How do you quantify clean air? How do you quantify helping a disabled child? How do you quantify most of the goals of regulation?

There are always value judgments and for that reason, I believe that I suggested and I've worked closely with Senator Dole throughout this. I suggested that instead of having, for example, judicial review over what gets reviewed, require that everything above a certain threshold be reviewed.

I don't think we need correction today. I think we need corrections in the decade.

The problem isn't a moratorium on existing rules. It's getting rid of the 100 million words of old rules that have turned into cast iron and don't allow not just bureaucrats to exercise their judgment, but citizens. It's a two-edge sword.

When the rule is made out of cast iron, it not only sits on top of the bureaucrat. It also sits on top of the factory foreman and everyone else. So deliberation works both ways.

So, I believe that there are very good parts to the laws that have been proposed, but they should take away most of the judicial review and ratchet up the responsibility of Congress to review new rules.

Ms. MCCARTHY. Thank you very much. I appreciate those thoughts. Dr. Mendelowitz, did you want to comment on my question?

Dr. MENDELOWITZ. I think that I have not personally looked closely at the reform proposals. I don't feel capable of commenting on them.

But I think that I take a somewhat different tack to the same place that Mr. Howard does with respect to regulation.

The problem with regulations have been described as the fact that they're rigid. They focus on process. And they're difficult to change and impose high costs.

If you go to the total quality management literature, one of the things you find there is a tremendous emphasis on having organizations, whether they be manufacturing companies, service companies, government agencies, focus on processes that are able to produce the product of the organization as defect-free as possible.

The objective in TQM is to take the process and do it over and over in the same way to ensure high quality.

Now, if regulations are rigid and are being criticized for being rigid, yet TQM, which is viewed as making a tremendous contribution to the competitiveness of firms, also uses a rigid process in a sense, because they have a fixed process, how can these two observations be reconciled?

Well, the answer, I think, lies in the fact that the end result of the TQM model is not the process itself, but it is in delighting the customer.

The end result is focusing on the product, with the goal of constantly making the product inherently better, producing it defect-free, and reducing the cost of producing it.

And so these processes in the TQM model are constantly being refined and changed. Every time someone in the process—a worker, a manager, it doesn't matter who, anyone—can come up with a way of improving the process, making the product better, reducing the costs, it's tried.

The consequences of trying it are tracked. The results are measured. And if they can demonstrate in fact that the process improves quality, reduces costs, it becomes a new process.

So the key in the TQM model is a focus on the ultimate customer and the outcome of the process, the goal of the process. And the process serves that goal.

To make the regulatory process comparable, what you have to always do is not focus on the process qua process, but focus on the legislatively mandated goal, the cost of achieving that goal, and having a process which can be changed sufficiently easily so that the process can be changed to both improve the ability of achieving the legislatively mandated goal, and reducing the cost to society of achieving the goal.

Mr. HOWARD. Could I add one thing, which is, the TQM varies from plant to plant, from state to state, from country to country.

We have a legal system that assumes everything must be the same for everybody. So it's not simply that difference, but there's a false god of uniformity that as government has crept into the nooks and crannies of our lives, we assume that what happens in Tennessee should be the same as what happens in Maryland. That's not necessarily true. People will do things differently. They ought to be allowed to do things differently.

Ms. MCCARTHY. You'll get no argument from me. I have a long history in state government and I think each state is unique.

Thank you, Mr. Chairman.

Mr. WALKER. Thank you, Ms. McCarthy.

Mr. Gutknecht?

Mr. GUTKNECHT. Thank you, Mr. Chairman. I also serve, and I'm so happy to finally see Mr. Howard. I am like Johnny Appleseed. I carry around—and I'm surprised I don't have them with me this morning—Reader's Digest versions of your book.

And as a matter of fact, I don't know if you're a C-SPAN junkie, but a couple of weeks ago, we did a Special Order and I talked about "The Death of Common Sense" and used some of the examples of it and invited people to write in or call for copies, and we mailed them back out.

I don't know how many exactly we sent out, but I do remember we got a request from Grizzly, Colorado, which must be way up in the mountains somewhere.

[Laughter.]

So it's nice to meet you and I welcome you to this Committee. I also would encourage if you have not met with Representative McIntosh, who chairs the Regulatory Reform Subcommittee, we'd certainly love to have you come and visit with us sometime and talk about some of these issues.

I want to throw out—a couple of years ago, I had an opportunity to spend some time with an old judge. It was interesting. You talked about the legal system. He told me a number of years ago, when he first went on the bench, it was in a small community in Minnesota. He talked about the police force there.

And he said, back then, they were called cops and their job was to keep the peace. He said, that was 25 or 30 years ago. And he said, if somebody had a little bit too much to drink, sometimes they would just put them in the back of the car and take them home.

Now we have law enforcement agents and their job is to enforce the law, not keep the peace. And if somebody has a little too much to drink, they take them to detox and there's a very long and expensive process.

I think that is sort of analogous to where we are with this whole issue of regulatory reform.

But the risk we take, and I'm not certain we're quite ready as a Congress or as a society to allow the latitude back to some of these people—and I refer to the police because I think that's the first line. That's the thin blue line between us an anarchy—to really give them back that authority and say, it's your job to keep the peace. We're going to give you an awful lot of latitude in how you get it done. Would either one of you care to respond to that?

Mr. HOWARD. The change works if you have someone above the police officer whose job it is to make reasonable judgments and hold people accountable.

The changes doesn't work if you give the lower level discretion and then you don't give the upper levels the responsibility to make sure that the discretion is exercised properly.

What we've done is take away—again, we've looked outside ourselves, discretion from everybody. We can't give it back to one level and have it function because you'll be judged by the law again.

The complex shapes of every choice that a cop makes, every one of those choices is complicated. That complex shape can never be squeezed into a square legal whole, no matter how many rules you have.

So you need to have people above him who are willing to take responsibility for making sound judgments and then being held accountable to the public, to the mayor ultimately, and to the voters, if judgments aren't being made the right way.

Dr. MENDELOWITZ. I think you've identified a very real problem in searching for a solution.

Flexibility in achieving regulatory objectives is desirable. Simply giving individuals the authority to be flexible runs a risk of them being arbitrary.

I was in Japan last March and I met a diplomat from the embassy of one of the former Soviet Union new emerging states. The first thing I asked him was whether he had been in the old Soviet foreign service or in fact he had just joined the foreign service of his new independent country.

He said, no, he had not been in the Soviet foreign service. He was in fact an academic.

And then I turned to him and I said, tell me, what do you think of Japan? And he thought for a moment, scratched his head, and

he looked at me and he said, you know, what it really reminds me of is the old Soviet Union.

I was a bit taken aback because my view of the Soviet Union is nothing worked and my view of Japan was, at least in manufacturing, things work. There are good products on the shelves. The shelves are stocked. And I said, why?

And he said, well, you know, in the old Soviet Union, what made the system unbearable was the tremendous power of the bureaucrats. You couldn't do anything without getting one of the apparats to sign off and give you approval.

And he said, in Japan, the bureaucrats have tremendous power. And the reason why they have tremendous power is that there are a lot of regulations in Japan that are very vaguely written. To do anything requires regulatory approval, and that means going to a bureaucrat and getting his signature on a permit which allows him to interpret these vague regulations. And so, you're at the mercy of the bureaucrats.

So that you really need to think very carefully about how to build flexibility in without resorting to arbitrary bureaucratic behavior.

I think the way to do it is to constantly focus on outcomes. Does the flexibility that's permitted in the system to whomever contribute to a good outcome or not?

If you give a safety inspector flexibility, and you track the accident rate in the factories that he is inspecting and safety improves, then he's doing something right.

If you give him flexibility and the safety and injury rates go up, then he's doing something wrong.

So I think the key to successful flexibility lies in, one, focusing on outcomes and, two, focusing on incentives, so that in fact the folks who have primary responsibility for doing things that achieve the regulatory objectives—namely, managers of the private sector who have to do things in accordance with the regulations—in fact, have incentives to do them effectively and do them efficiently.

Mr. GUTKNECHT. I just want to thank you once again for coming. I think this is a discussion—as I say, I'm the Johnny Appleseed handing out copies of the Reader's Digest version, which we purchased, incidentally. We went through the right—we didn't just copy them off on the Xerox.

[Laughter.]

But the point is that this is a discussion that is incredibly important, I think, to the future of this country and this economy.

The estimates I've seen are that unnecessary regulations are costing our economy somewhere around $500 billion a year. And somehow, we have to get to the next—I hate to use the term—paradigm. But we have to change attitudes about the way the regulatory process works if we're going to be competitive in the 21st century market place. So thank you so much for coming. And Mr. Howard, maybe you had another comment.

Mr. HOWARD. Well, I just want to say, on cost, the $500 billion, which is Tom Hopkins's number, and I guess a lot of people throw that around, a lot of that regulation is probably necessary because a lot of the environmental regulations are going to cost money. A lot of it is incredibly inefficient, like the way OSHA has worked in the past.

But the greater costs are the costs we were talking about earlier. There's a cost to productivity that hasn't been measured. Those are direct costs.

And the largest cost of all is the cost to our values, the cost to values of a system where people keep looking outside themselves for the answer instead of looking in the mirror and saying, what makes sense? What can I do?

It's a society that's sort of lost, in a sense, the American spirit because we have too many rules around us telling us how to live our lives.

Dr. MENDELOWITZ. I wouldn't focus with overly great confidence on any number because, as Mr. Howard pointed out, there are in fact the benefits that ensue to some of these costs. And any economic assessment like this is subject in precision.

But the value of these kinds of numbers is that they focus attention on the need to think about how we do these regulatory undertakings in an efficient way because the numbers indicate there are large numbers involved, large resource commitments, which, if these resources were used more efficiently, could achieve regulatory objectives that the Congress establishes and contribute more effectively to a rising standard of living.

There's another aspect of the cost of regulation that we point out in this 18-year-old report which is important and tends to get missed, and that's the fact that regulation can, in some cases, be a disincentive to innovation.

And the extent to which regulation is a disincentive to innovation, there are costs in the form of foregone innovation that we can't even begin to measure.

And even if we don't measure those, those are important costs. I'll just give you one example.

In the first round of efforts to meet automotive environmental standards, the automobile companies were given an anti-trust exemption to get together and come up with a single way of meeting emissions standards.

On the one hand, some folks thought this was a good idea because it concentrated research resources and efficiently came up with a way of meeting the environmental standards.

I viewed it, personally, as something of concern because what it did is it was a disincentive to innovation to meet the standards. It basically said, the Big Three automobile companies are working together. They're going to come up jointly with one way to meet the emissions standards. And then, efficiently meeting emission standards doesn't become a basis for competition between the companies.

Everybody will have the same regulatory solution. Everyone will have the same cost structure, and they will proceed to compete on the basis of other things.

And it seems to me that competition on finding efficient ways of meeting a regulatory standard is a powerful incentive to come up with new, more efficient, and less costly ways of meeting the objective.

There was one company, interestingly enough, that was not part of the consortium. It was a rather small company at the time. And it was the single company to come up with an alternative to the first-generation catalytic converters as a way of meeting the emis-

sions standards. And that was Honda, which came up with the only, I think, automobile ever put on the market that met that first-generation emission standard test without a catalytic converter. And that was the compound-charged vortex cylinder engine.

I am really—I wonder how many possible innovations like that were missed because the companies, in a sense, weren't forced to compete on coming up with more efficient, less costly ways of meeting those standards.

Mrs. MORELLA. Thank you. I wanted to now turn for questioning to Mr. Tiahrt from Kansas.

Mr. TIAHRT. Thank you, Madam Chairman. Mr. Howard, I think in part, through inspiration of your authoring "The Death of Common Sense," and from the Speaker of the House encouraging a Corrections Day, I held a meeting in Wichita, Kansas, which is where the Fourth District of Kansas is located, plus the surrounding counties, and we asked people to come in and bring us conflicts that they've had with the Federal Government in regulations that defy common sense.

And we had over 50 different issues brought up. We're tracking them like action items, trying to see if we can't solve some of that problem.

One of the things that seemed to resonate throughout that hearing is that when one thinks of regulations, the word OSHA comes to their breath.

There's been quite a struggle, particularly in the construction community because there's been a recent regulation released. I met with the regional director, Tom Marple, regional OSHA director. And I think after talking with him, most people want the same thing. The people who create and keep jobs want a safe work environment because of worker's compensation costs and because many of their friends work for them. And the people in OSHA want to have a safe work environment. It's their job and they have a true concern.

But every time they stop at a work site and the door opens, it seems like a fine soon follows.

So when we look at how do we solve this, and I view part of my job as getting the people who pay the taxes together with the people who try to make a safe environment so that there's a working relationship. And I have been so far unsuccessful in doing that, but we're still working on it.

It seems like there's two choices. One is we just kind of give it to the states, like we've done in other parts of our agenda, and I think that does have credence because there are 50 state laboratories which will come up with new ideas.

And the other is, maybe as Dr. Mendelowitz has suggested, that we have some type of incentives and outcomes.

Do you think we can work through the regulatory process to develop some way, directly as the Federal Government, to our agencies, to create an environment where the regulators work hand-in-hand with those to create a safe environment?

Mr. HOWARD. First of all, every area is different. Nursing homes are different than workers' safety. It's all different. When you're dealing with areas of human conduct, unlike the environment where you're talking about toxins going in the air, talking about

nursing home regulation, workers' safety, which is really profoundly human, you have to, first off, acknowledge any system has to deal with the humans and the human calculus, human incentives, human management training, all of that. And judgment and intuition, et cetera.

OSHA this year announced a program called the Maine Project, or something, where basically, the incentive for them to be, for factories to be safe, is that they don't have to comply with the rules, or at least they won't be enforced. The rules won't be enforced against them.

And in Maine, it's worked spectacularly. The condition is sit down with your workers, come up with a worker's safety program, whatever you think makes sense with your workers. And if you do that, we won't come in and write tickets.

And what happened, it's using regulation as a sword, so it's perhaps not a long-term solution. But it has worked very effectively. Worker safety is done because people aren't focusing on what isn't important. The height of the railing isn't important.

What's important is the machine over there where all the accidents happen, for reasons that no rule-writer ever thought of.

So that that's one approach that they're taking to try to meet it. I've tried to convince them into turning OSHA into a pamphlet or a series of pamphlets, which they thought I was kidding, initially.

And I asked them, well, who do you think has read OSHA? And they said they didn't have any empirical data on which to answer the question. And I said, I knew who had read OSHA. Nobody who was important has ever read OSHA's rules. So why bother with them? Why not have a pamphlet that people can understand?

So they're working on things. But I think that systems, which is what you're talking about, new systems are important to experiment with. I'm not sure it should be state-wide. Some things are appropriately left to the states, some things are not. Environment clearly is not, to use an example. There are too many overlaps.

But it's time to experiment with these systems. It's time to figure out, going back to Dr. Mendelowitz's position—what works? How do you achieve the outcome?

I think the winds have—I don't know if they've shifted. They're certainly swirling, and now is the time to get people to try things.

Mr. TIAHRT. I have a few other questions, but I think I'll yield back the balance of my time because of some pressing needs of others.

Mrs. MORELLA. Thank you, Mr. Tiahrt. I know that Mr. Howard has an appointment at 11:00. We'll move the clock back. But I would like to recognize Ms. Johnson, if I might, for questioning of this first panel.

Ms. Johnson from Texas?

Ms. JOHNSON. Thank you, Madam Chairman. I will attempt to be brief. I want to ask Mr. Howard a question about his opinion of the flexibility or nonflexibility or not enough power for federal judges.

I was of the impression that they had a lot of discretion in rulings and can dismiss frivolous lawsuits under the rules of civil procedure, and really have done so quite broadly.

You mentioned the McDonald's case and the one case we've all read about. But there were numerous cases before then, but McDonald's did not change any policy until that lawsuit came and the judges did take the discretion to reduce the first court's award.

Now, I'm a nurse by profession. I've seen some of these burns. We have heat strokes when people experience temperatures of about 100 degrees or so Fahrenheit.

This coffee was 280 degrees. That's quite hot. Try to imagine what that would be like wasted on your genitalia. It's quite hot and third-degree burns come from that. How do you value human life and human condition in cases like that?

Mr. HOWARD. I'd like to respond in three ways. First, judges do have discretion. It is the job of judges to judge. They are not, in my judgment, doing it. Most federal and state judges agree with me. I'm going around speaking to them now and they agree with me, by and large, that one of the crises of the American judiciary is that judges have lost the sense of common values that allows them to make the kind of judgments that are required to give the American people confidence in the reasonableness of the system.

Watching the O.J. Simpson trial, I'm afraid, has done everything to further deplete the confidence of the American people in the system.

As to the hot coffee, the coffee was 180 degrees, which is in fact hotter than Burger King's coffee. It is hotter. McDonald's deliberately makes it hotter because it brews with better flavor, they believe, and it stays warm longer.

Burger King and other places have it at 165 to 170. If you spilled that, instead of getting third-degree burns, which were horrible. This lady suffered horrible burns. You would get second-degree burns.

My son at the age of two spilled a cup of coffee and went to the hospital with second-degree burns. I know what burned coffee can do to someone because it happened in my own family.

But there are many things that we do, including driving a car, flying in an airplane, riding a bicycle. There are many things that we do—crossing the street—that involve risk.

If the coffee tastes better, people go and buy it because of that, even though it's a little hotter. McDonald's had 700—that's a lot—complaints and incidents involving its coffee. But in the same period, McDonald's had sold over 7 billion cups of coffee.

And I respectfully submit that one of the problems with America is we've lost what it means to evaluate risk. Risk is important. It is a precondition to every sensible judgment.

McDonald's had made the judgment and consumers—this is not a hidden defect. It is hot. You hold it, it's hot. If you start to swallow it, you're going to scald yourself because it is hot. It is not a hidden defect.

It is the kind of judgment I think Americans should be free to make. It was a terrible accident. But I respectfully submit that if I were a judge, I would have dismissed the case because this person, who I feel sorry for, bought the coffee, and because she was frail and other things, couldn't control it and it spilled on her.

Ms. JOHNSON. One final question. The State of Texas, which could probably hold half the country by geography, did a survey,

not by a bureaucrat, and indicated that almost 100 percent of the job injuries happened in companies or plants that had not had an OSHA inspection for the last four or five years. Is that a coincidence?

Mr. HOWARD. No—well, it is in this sense. OSHA, in my view, has gone about its business completely backwards. It should focus on not big business. They should encourage big business to do self-regulatory things and check on them every once in a while, like the stock market does.

It doesn't focus because it only has a very limited budget, probably too small a budget. It only has 2000 inspectors for 6 million work places.

Ms. JOHNSON. They said that was the reason. They didn't have the money or the people.

Mr. HOWARD. Right. They don't have enough inspectors to go out. The accidents happen in sheetmetal shops and in places where people don't care about the economic incentive and where OSHA never gets to because they're too small.

Some of them are big, but most of them are small. They're contractors who aren't careful, who don't give them the right equipment. But that's because OSHA sees its job as having to look at every single thing, instead of bearing down on the industries and the people where most of the accidents happen.

And I would argue, and I've told the head of OSHA this, I would argue for more OSHA funding in exchange for a complete changing of the OSHA philosophy of regulation. It ought to check up on those people.

Ms. JOHNSON. Thank you.

Mrs. MORELLA. Thank you. I'm going to recognize the Ranking Member of the Subcommittee for questions. I know Ms. Lofgren has joined us, and I think she said that she would submit any questions for you in the interest of your time and the second panel. And we'll let her be one of the first to ask the next panel. Is that okay?

Ms. LOFGREN. [Nods in the affirmative.]

Mrs. MORELLA. Thank you very much.

Mr. TANNER. Thank you, Madam Chairwoman. I want to thank you all very much, too, for being here, and I hope you had a pleasant stay in Oak Ridge. I went to school in Knoxville, not far from there.

Your testimony has been very enlightening and helpful and I'm sure your experience at Oak Ridge contributed mightily to that.

Mr. HOWARD. That's right.

Mr. TANNER. Your association with Tennessee. As I said earlier, I don't think anyone has any problem with anyone, that's been said with respect to how we wrestle with constantly and on an ongoing, continual basis to make reasonable judgments around here, and to give regulators reasonable latitude and also responsibility with the discretion that's granted through law or regulation. But I want to come back to technology.

This is the Technology Subcommittee and I think there's been very little discussion thus far about technology.

I couldn't agree more with what's been said about the silly rules and regulations and Congress has done, quite frankly, a poor job,

in my opinion. And this member has said repeatedly that the majority party here ought to be commended, and I have on numerous occasions, for bringing these matters to public debate and to this hearing. And I want to thank the Chairlady again for so doing.

My question is simply this. This hearing charter, and I went back and read it. And it says in paragraph four—American enterprise needs a balanced regulatory, tax and legal environment. With market-driven, innovation-friendly policies, the private sector stands ready to develop new products that create jobs, provide economic growth, and improve the quality of our lives in the 21st century.

I agree that in the short term, all of the things that have been discussed so far will make a big difference and should be done as quickly as we can reach a consensus on what's reasonable in that regard.

What my fear is and, again, I want to ask both of you to comment, please—even if we do all of that, is there any data or anything that would lead either one of you to believe, and do you have any evidence to suggest that this country can maintain its competitive edge as a world leader in innovative technology if we do not have some private/public partnerships, such as NIST and other areas of government that engage in those sorts of things, that our industry can utilize to do the things as an industry that no company can do individually?

As you'll remember, I read about the AT&T bust-up. Now that doesn't mean anything this year. It doesn't mean anything next year. It may not mean anything in five years.

But I remember not long ago, the Japanese had a technology to measure the width of silicon wafers. We didn't have it. They would not sell it to us. We could not have it.

No one company, in my view, and I want your honest assessment—I know it will be—no one company can engage in this far-ranging, blue-sky research in technology that will develop something that we can only dream about today, 20 years from now.

With all of the things, if we did everything that you all suggest on the short term, on macro-economic policy, regulatory relief, legal reform, all of that—I come back to—use Federal Express in Memphis, Tennessee.

Federal Express has been a great innovator in the movement of packages and so forth, overnight around the world. Federal Express, on their own, could not have invested in the airports where their planes land.

They could not have built the roads to carry the packages once they got to a distant airport. That's what I'm afraid, that these hearings only go halfway. And I think we need to at least give some sort of thought to, where do we go from here with what's going to happen, because the second part of this, page 2, as Paul Harvey says, is, in my view, a dramatic cutting of the government programs in this page 2 aspect of this thing that I don't think American industry is going to be able to pick up. And I'm talking about ten, 15 years from now, not in the next two or three years. I've gone on long enough.

Mrs. MORELLA. I appreciate the question that was asked. I just want to point out, as Paul Harvey would say, and for the rest of

the story, the second panel is also going to address that very issue, too.

Mr. HOWARD. Thirty seconds or less. Common goods are obviously important. The interstate highway system dramatically increased interstate commerce in a variety of ways.

Smart people—industry—the leaders of the computer industry, the leaders of the health industry, those people are probably the best able to advise, to come together with scientists and advise Congress on the need and the scope of the funding for the common goods, if you will, for the next century. It is an important subject.

Dr. MENDELOWITZ. How the Federal Government allocates public resources is the prerogative of the Congress. It would probably be presumptuous of me to tell the Congress they should spend money here and not spend money there, when that's clearly the unambiguous prerogative of the Congress.

But I think that the debate over R&D expenditures is really a debate that, I think, needs a big more enlightenment because it has two aspects.

One is how much money is being spent on R&D? That's the easily measurable part. How much is the government spending? How much is the private sector spending? What's it being spent on?

The second question really is what's the consequence of those expenditures? What's the impact? What's the realized outcome of it?

I asked one of my staff to try to get a handle on that because I was curious.

The truth is that there's actually very little, I think, research done on what the actual outcome is. I think what the Congress probably needs, as it deliberates over how much to spend and where to spend it, is probably a better analysis and more analysis on what in fact is accomplished with this in terms of technological change, as opposed to the issue of first order of outcomes, which is money spent.

Mr. TANNER. Is the GAO looking at this? I notice this is not a report, your statement. Is there an ongoing—

Dr. MENDELOWITZ. It's an issue that we think is important to look at. I have to be quite honest. Number one, it's an extremely difficult undertaking. If we begin it, I can't guarantee that we'd come out with the outcome. But I think it's something worth looking at.

Secondly, GAO is in the midst of a very significant down-sizing, reordering of the resources that are left. Everything that we initiate is being given very careful scrutiny based on the multiple demands that we have to meet.

And so, our ability to look at this is both a function of total resource demands on a smaller GAO, as well as the methodological challenges.

Mr. TANNER. I understand and thank you for that. And I'll be working with the Chair of the Committee here to see if we cannot take a look at that because the decisions that are made today have enormous consequences ten years from now, like national security, whether we build an aircraft carrier or whatever today, has consequences in 2005. So I really think we need some further study and discussion on this one point.

Mrs. MORELLA. I'd be happy to work with the Ranking Member to try to draw something up that would be compatible with what you can do and what this Subcommittee would be interested in having you do.

I know we've had you look at a number of the other issues that have come before this Subcommittee, and we'll do that. I want to thank you both very, very much. You've been here a long time. We very much value the testimony that you have given us. Mr. Howard, thank you. Dr. Mendelowitz, thank you very much.

Dr. MENDELOWITZ. Thank you.

Mr. HOWARD. Thank you.

Mrs. MORELLA. Thank you. I'm going to ask the second panel if they would come to the panel because it's a very large panel and I know we've had several members who have joined us and I'm going to give them an opportunity to ask questions. I'd like to ask the members to come forward, take seats at the table.

And actually, in order to conserve time and ensure that we have the maximum possible interaction between members and witnesses, we are going to dispense with the reading of any testimony and we're going to proceed immediately to questions.

And the witnesses we have here today before us—I'm going to add Mr. Dan Mitchell of the Heritage Foundation to the panel, too. He was invited, but he was omitted from the witness list.

He has provided us with written testimony which we will give to the Committee. The Committee has it before them, and we're happy to have him join us.

Dr. Judith Giordan, vice president, research and development of the Henkel Corporation in Ambler, Pennsylvania, a member of the board of directors of the American Chemical Society and Industrial Research Institute. We welcome her; Dr. Francis Kapper, director, advanced government programs, Corning, Incorporated, Washington, D.C; Dr. Thomas Lenard, Progress and Freedom Foundation in Washington; Mr. Jesse Greene, vice president and corporate treasurer, Eastman-Kodak Company in Rochester, New York; Dr. Daniel Garner, president, Cellmark Diagnostics, Germantown, Maryland, District 8 Maryland; and Mr. Andrew Wyckoff, program director, industry, telecommunications and commerce in the Office of Technology Assessment, Washington, D.C. Talk about down-sizing.

[Laughter.]

STATEMENT OF JUDITH C. GIORDAN, PH.D., VICE PRESIDENT, RESEARCH AND DEVELOPMENT, HENKEL CORPORATION, AMBLER, PENNSYLVANIA; MEMBER, BOARD OF DIRECTORS, AMERICAN CHEMICAL SOCIETY AND INDUSTRIAL RESEARCH INSTITUTE; FRANCIS B. KAPPER, PH.D., DIRECTOR, ADVANCED GOVERNMENT PROGRAMS, CORNING INCORPORATED, WASHINGTON, D.C.; THOMAS M. LENARD, PH.D., PROGRESS AND FREEDOM FOUNDATION, WASHINGTON, D.C.; DANIEL J. MITCHELL, MCKENNA SENIOR FELLOW IN POLITICAL ECONOMY, THE HERITAGE FOUNDATION, WASHINGTON, D.C.; JESSE J. GREENE, VICE PRESIDENT AND CORPORATE TREASURER, EASTMAN-KODAK COMPANY, ROCHESTER, NEW YORK; DANIEL D. GARNER, PH.D., PRESIDENT, CELLMARK DIAGNOSTICS, GERMANTOWN, MARYLAND; AND ANDREW W. WYCKOFF, PROGRAM DIRECTOR, INDUSTRY, TELECOMMUNICATIONS AND COMMERCE, OFFICE OF TECHNOLOGY ASSESSMENT, WASHINGTON, D.C.

Mrs. MORELLA. So I'm delighted to have this very prominent panel. And I think what we'll do is we'll start off with questions.

I'll just ask one question so that I give others an opportunity to utilize your expertise and your opinions.

From your experiences, I wondered if you might give some examples or an example of how government regulation has affected technology development and commercialization in your companies or in your experience in the case of the two organizations. And maybe—I don't know—Dr. Giordan, would you like to start off?

Dr. GIORDAN. I think when you sit back and you take a look at regulation in its broadest sense, I think you begin with that wonderful statement from Proverbs 29:18, sitting above you, which says, "Where there is no vision, the people perish."

I believe that, recently, one of the things that we often forget is that in the wonderful tools of TQM, re-engineering and things like that, that they are only tools. And in regulation, they are only tools.

And that what one needs to look at is what is the broader vision and the use for those tools down the road in five, ten, fifteen years, in terms of the innovation they will allow, where innovation, in my mind, is both the total creation as well as the commercialization of technology.

I think regulation, therefore, plays a critical role because it is a tool. It is not an end in and of itself.

And unfortunately, sometimes, we put the emphasis on a different syllable. We create that as an end and not a means.

I believe regulation can be very positive and very helpful in assuring that our water supply, our air supply, our drug supply, our goods, in a uniform way across boundaries that are national, international and state, are regulated in a constructive way, and I think we've seen wonderful ways to assure that in terms of Department of Transportation codes, et cetera, et cetera.

I think a way that it has helped the chemical industry, actually, and many people will say that's not the case, is in helping as an incentive, to making sure that we self-regulate ourselves. But, again, it is only a means, not an end.

And I believe a thing that regulation cannot help is in great detail trying to tell us, and we've heard this before, from location to location, what to do. And regulation, from a legal standpoint, also cannot help us if what it does is say that we can't work together or we can't incentivize the creation of technology, as well as the whole commercialization process, because I agree with Mr. Tanner completely when he says that productivity is not the only means here.

We have to worry about the future and we have to put projects and programs together that are creative.

Regulation needs to help that full creation process, that full innovation process. That is where they have not helped. But they have helped in being sure that certain supplies and certain day-to-day issues are taken care of.

Mrs. MORELLA. Mr. Wyckoff?

Dr. WYCKOFF. Okay. I will be very brief, as well, on this. And because you've heard from the previous panel most of the downside about regulations, I guess I will echo on the comments that were just said just for a second to give you a balanced perspective on this.

Regulations, I would argue, you should try your best to try to internalize them, as Dr. Mendelowitz was saying, so that they are part of the market mechanism and can thus affect corporate decisions in an efficient way.

But the government plays an important role here, particularly in the innovation process, with so much regulations.

They include things such as legitimatizing new innovations that the public would otherwise be wary of, such as new airplane design or new jet engines. These help, these government standards or these government regulations help the adoption of these innovations.

Likewise, it helps establish new markets in their infancy stage. We do see that by granting panels which allow super-normal profits for these firms so that they can recoup some of their up-front expenditures, or we grant monopoly rights, such as we did to Bell Labs and the Bell system back before we broke it up.

Lastly, and it's been touched on today and I'll just reiterate it, it's important. There are market failures. One of the most classic market failures is that of the public good and the tragedy of the commons. It's important. These include things such as air quality or bringing a man to the moon.

That wouldn't have been done by any one firm, but, rather, it was seen as a collective good that we wanted to achieve. And to achieve that, you'd intervene in the market through either government intervention or regulation. Let me stop there.

Mrs. MORELLA. Dr. Garner—and I want to publicly applaud Cellmark for the work in the O.J. Simpson case, really very historic.

Thank you.

Dr. GARNER. Thank you very much. I would also broaden my comments to include not just Cellmark, but our parent company, which is Zeneca, which is a multi-national. We are an extensively regulated company, in that, because of our pharmaceutical work, we're regulated by USDA, FDA. We're also regulated by EPA.

So we have had a wide variety of experiences as far as a regulated industry. Some of those have been positive. Some of those have been less than positive.

But we, as a company, recognize the need for oversight and regulations in certain areas.

But it has been kind of varied experiences, from our perspective, in the agricultural chemical area, as well as the pharmaceutical area and the biotech area, in general.

Thank you.

Mrs. MORELLA. Thank you.

Mr. Greene?

Mr. GREENE. Thank you. Let me speak about Eastman-Kodak.

Eastman-Kodak, of course, is largely a consumer products company at this point. We divested ourselves of our medical industries earlier last year.

Today, we're focused on the consumer products area and imaging technologies.

The major regulations that we face, of course, are in the area of manufacturing facilities. We have a very large manufacturing facility in Rochester, New York, which uses many different chemicals in the production of film and film products, paper products.

The regulation process we view as a necessary part of protecting the environment.

But we believe that reasonable implementation of the regulations that allow manufacturers the flexibility it needs to meet the market needs are important. And we work very closely with the regulators to try to meet the needs of the community, and to meet the needs of the regulations in terms of air and water quality.

And yet, we look for balance in terms of flexibility to manufacture the goods that we are trying to serve the market.

Dr. LENARD. I think it's important to focus on a couple of very specific areas which are very high-technology, high-innovation sectors, and where the government, through its regulatory programs, requires specific approval basically to introduce as sort of a licensing procedure, specific approval to introduce a product to the market.

And the combination of that specific approval function, the government serving as basically the single gateway to the market, combined with sectors that have great potential for innovation, I think, is a recipe for difficulties and creates a very adverse incentive on regulation.

You see very important examples of that in terms of the FDA, food and drug regulation, where the cost of bringing new drugs to market has increased tremendously. Basically, the research and development costs have skyrocketed, where the number of products actually introduced to market have been flat over the last 30 years.

The medical device industry is basically moving to Europe, at an alarming pace because they can introduce their products there.

You see similar effects in the EPA's regulation of some biotech products where the companies have to go through EPA in order to get to market and you see in the telecommunications area, where licensing approval is required also to introduce new services that, in many, many cases, the introduction of these services is delayed for many, many years.

Mrs. MORELLA. We'll later have to find out how you feel about the legislation being introduced to expedite approval with FDA, too.

Dr. Kapper?

Dr. KAPPER. Thank you. Corning is similar to Eastman-Kodak. As a manufacturing company, we make about 60,000 different products, everything from telecommunications, optical fiber, environmental products, et cetera.

The point that was made before, and I think was perhaps not as well clarified, and it should be, is that regulations have both pluses and minuses for our manufacturing concerns.

One of the costs that really is never identified in most cases is the lost opportunity cost. Companies very frequently wind up paying costs, and it's really not calculated in the cost of a regulation simply because you couldn't do anything.

And this can be anywhere from, in the export control regime, to not being able to do something without extreme hurdles having to be overcome, either administratively, from an experimental standpoint, and otherwise.

Regulations, I think, are a way of life. I think they're needed, simply because of the human nature.

But, by the same token, I think that reasonableness in them is something that I think should be a matter of discourse.

Mrs. MORELLA. Mr. Mitchell, thanks for submitting your testimony here, too. It looks pretty succinct. You may want to comment on it.

Mr. MITCHELL. Thank you very much.

I'd like to focus just real briefly on tax policy and the impact on innovation because before someone in the private sector is going to try to bring a new product to market or to add something to an existing product, they're looking at whether or not that's profitable.

Under our current tax system, a dollar of capital income, the type of income that comes from the savings and investment that yields the innovation and productivity growth, a single dollar of capital income can be subjected to as many as four different lays of taxation between the capital gains tax, the corporate income tax, the personal income tax and, in some cases, the estate tax.

And so, before we even get to the stage where products are subject to the regulation, I think we're losing out on an awful lot because a lot of products never get developed simply because our tax system, in effect, tells people, if you save and invest and move to innovation, you're going to get a very, very low return on it.

Thank you.

Mrs. MORELLA. I'm curious about how you'd remedy it. I know you talk about flat tax. But I'm going to turn it over now to my Ranking Member, in the interest of fairness, for questions he may have for the panel. Indeed, yes. He's going to defer to Ms. McCarthy, who has a pressing need.

Ms. McCarthy?

Ms. MCCARTHY. Thank you, Madam Chair. I appreciate that, Mr. Tanner.

And I wanted to inquire of Dr. Lenard, with regard to your testimony that you submitted today, and particularly on the segment on biotechnology, which is of great interest to me. I represent a dis-

trict in Missouri and this segment also talks about the Monsanto Company in Missouri.

You talk in this section about the FDA holding products hostage and discouraging their development.

I'm looking on page 5 of your testimony, and you cite examples, three, and one of them being the Monsanto Company, which was denied permission to undertake a field test of a biotech product aimed at controlling a corn-eating insect, that Monsanto used a crude or conventional genetic technique.

You hold that the field trial would not have been subject to government oversight at all. You conclude Monsanto subsequently dismantled its entire micro-bio-control program.

Would you provide us with some additional details in this case? I know it was in the mid-'80s. I understand why Monsanto did what they did. These isolated statements appear accurate, but I would like you to explore your conclusion a little more closely with us today.

Dr. LENARD. Well, I mean, the source of my information is an article on this issue by Dr. Henry Miller, who is currently at Stanford at the Hoover Institute, and was formerly head of the biotech office at the FDA. I'd be happy to share that article with you.

I don't know that any—I don't have much more detail than is presented here. But I think this accurately portrays what has happened.

The major point is that, clearly, erecting these very high regulatory hurdles is going to have an adverse effect on innovation.

Ms. MCCARTHY. I see a footnote no. 2 on page 5 with regard to Henry Miller. I don't see it attached to the Monsanto example on page 6. So I was not under the impression that this example you chose—

Dr. LENARD. I'm sorry it was unclear. I think it says the examples discussed here are from—all the examples are from that article.

Ms. MCCARTHY. Well, let me point out to you, then, so that you can revisit the article by Henry Miller, that it's true in the mid-'80s, Monsanto was developing a genetically-engineered critter that would kill corn root bores and they were denied permission to do the test by EPA, but it was primarily because where the test was proposed, there was a great deal of opposition to it.

But to conclude that if they used a conventional genetic technique, they would not have been subject to government oversight at all, is an appropriate statement in isolation. But they couldn't have used a conventional genetic technique in this particular development. It was not an option. And so, linking those two thoughts leads to an improper conclusion.

And your third statement that you borrow from Henry Miller that they did get out of the micro-bio-control business, they did, but they did because of low profitability. It was never as cheap as the conventional pesticides and they made a business decision based on that. And they confirmed that with me.

And so, I just really have problems when isolated statements are thrown together and leave and impression that is not accurate, according to the actual incident.

I wanted to bring that to your attention because if you're planning to disseminate this statement beyond today's hearing without the clarification that's needed, I think that you're doing a disservice to Monsanto and also misleading the readers with regard to your statement on FDA holding hostage and discouraging development. Those two conclusions in the opening biotechnology paragraph don't apply to this particular Monsanto example.

Thank you, Madam Chairman.

Mr. GUTKNECHT. [presiding] We'll now go to Dr. Ehlers.

Mr. EHLERS. Thank you, Mr. Chairman. I apologize that I wasn't here earlier. I had a hearing in the Aviation Subcommittee, and also some floor speeches. So I was detained.

In view of the fact that I wasn't here to hear the testimony, I dare not ask any questions, although I certainly would like to get into it.

But the questions may have been already answered. So, in that case, I will yield back my time or be happy to yield it to any of my colleagues who wish extra time.

Mr. GUTKNECHT. Ms. Lofgren?

Ms. LOFGREN. Thank you. I think it's easy for us here in Congress and, then, frankly, in the country, to try and latch on to kind of the magic bullet solution when in fact it's a multitude of things that we need to look at and do.

I am, as Karen, new to the Congress. I've been here nine months. I agree very much that we need to streamline and make more efficient and goal-oriented our regulatory system.

I am a cosponsor of one of the forms of an R&D tax credit to make it permanent, especially for high-tech research, and I think that makes sense.

But I'm questioning, really, whether those two things in isolation would really achieve what we need for our country in terms of long-term investments.

And I was interested to see you, Mr. Greene. I was remembering, my last year in high school, I worked the night shift at the Eastman-Kodak plant, from 7:00 in the evening to 4:00 in the morning. My job at that time was sorting little yellow slide boxes by number. I did that all night, little boxes into bigger boxes.

Recently, they just tore the plant down. But before they did, I went back there and they said all of that is computerized now. There are no young girls sorting these boxes by numbers.

I'm wondering, the innovation that has occurred that allowed not just research by your company, but by an entire sector of our economy that allowed that efficiency for your company and others, would that really have occurred simply with a better regulatory system and an R&D tax credit?

Mr. GREENE. Let me respond to that by saying that research and development is a high-risk area, especially at the high-tech areas that you're talking about.

Computerization such as you're talking about may or may not be in the high-tech area. Research and development tax credit is an important incentive for high-risk projects. It is something that has been around in the code for a long time, but has been temporary in nature and therefore, in my view, has not received, has had as

much influence as it should have had on high-tech research and development.

In my view, if you had had a permanent credit at a higher percentage credit, especially in the last ten years since they moved the base period up to the '84 to '88 period and therefore, eliminated a lot of the credit for major companies, it would have had a bigger influence on major research and development projects.

And one of the issues for us and the reason that we're here today is that we believe that if in fact the credit were made permanent and were structured in a way that would enhance the opportunity for companies to take advantage of it, that it would have a big influence on the research and development effort.

Ms. LOFGREN. Well, let me ask you this, or any other panelist who has an answer.

I talked to someone in the silicon chip sector yesterday who was talking about the inroads Japanese firms are making in the next generation of film, and that they are selling it at a loss. They are planning to incur losses.

The cost to produce the material is huge. The return is small. Consequently, there are no firms in the U.S. exploring it. And in his view, we will have no production capacity in this country, absent an investment that's basically a loss-leader for a good long time, maybe half a decade or probably more than half a decade.

And that the Japanese would then recoup their losses once they own the entire market. I'm wondering, how does an R&D tax credit address that issue?

Mr. GREENE. Well, what you've just stated is an expression of the risk associated with that industry. The Japanese definitely have a very long time frame, time horizon, in terms of achieving their required rate of return. And American companies have a much shorter time frame.

I believe that anything you can do to reduce the risk associated with research and development projects is going to help people take those risks. The research and development—

Ms. LOFGREN. If I can interrupt. You don't need to sell me on the R&D tax credit. I agree with that.

What I'm saying is if we improve our regulatory scheme, if we do the targeted R&D tax credits, are we still going to be able to compete against that kind of situation that was addressed to me?

Mr. GREENE. I think largely it comes out on assessment as to how long that loss period is for those particular companies.

I think the credit, though, takes some of the risk out of the project and out of the long-term time horizon in terms of achieving return and helps in that decision process.

Clearly, if the perception is that the horizon is indefinite in terms of when you're going to make a profit, it's very difficult to see the tax credit making a difference in that extreme case.

Ms. LOFGREN. Dr. Giordan, you were nodding your head. I wonder if you have a comment on that.

Dr. GIORDAN. I guess, in my opinion, there is a number of overriding factors, overview factors, in this.

First, I believe that a tax credit alone, as I was saying before, is a tool. It is not a means to an end. It is an important tool, but

it is only the means to an end. I guess I see this in a broader context.

Number one, I guess I feel that anything that we can do to improve productivity, as Mr. Mendelowitz was talking about before, is critically important. And I certainly don't have to share with members of Congress the myriad of things, and I put it in my statement, as I'm sure the other gentlemen have as well, the numbers of things you can do to help productivity.

But, ultimately, productivity has got a numerator and a denominator. And the numerator is how much you can get out per person. And you can get an infinite amount out if you get rid of all the people and innovate your heart out and just have no people left in the end.

So the real problem I see if, number one, you want productivity, but you want it based on my second point, which is the innovation process.

Anything that members of Congress can do to vote on improving an innovation process, which is creativity of ideas, whether they come from the university sector, the private sector or the federal labs, and then can be implemented through to commercialization with the use of tax credits as an opportunity to do that, with the use of maybe even improved tax incentives for the building of businesses and new technology, through concepts like this where university and intellectual property rights are better looked at, who should own the long-term intellectual property rights, how is patenting handled, such that you really can commercialize things? The last time I looked, I haven't seen a university build a plant.

So you need some way to make sure that you can take that technology to the market place. Anything you can do along those lines, I think is very, very critical.

Anything you can do along the lines that assures that companies have opportunities to work together where it is appropriate, and I see the very tenuous balance between the desire to create individually versus helping each other and the fear of group-think, because of the wonderful example that I believe Mr. Mendelowitz gave, that group-think can lead to not necessarily the best technological solution, is a fear.

On the other hand, how you incent what they do is another issue. So I think that's a critical part to the entire piece.

And my last point that I'd like to make is the overview, and that's the real vision. The vision in my mind is not to make the denominator in productivity go to zero. The vision in my mind is to make sure that the majority of the people in this country can be employed and feel that they are really parts of this system.

I have an intense fear, and I've published and spoken on this, that the have and have-nots—Newsweek and Time had a wonderful article about the technological future of this country and the technocratic haves versus the nontechnocratic have-nots.

I am terrified about this. And the more that we have this dichotomy, the greater problem we'll have when young girls like yourself can't get a job any more because of innovation. The scary part is so how do you work your way through college? We need to balance the human element and the literacy element. When I say, literacy, I mean scientific literacy, not to be afraid of science.

Anything you can do in terms of training programs, in terms of helping the general public feel positive about science and science literacy, anything that helps interactions with companies so that people realize that we're not the ogres that are just spewing black smoke out, but actually, we're all part of this planet.

Those things, along with tax credits and those specific issues, I think are part and parcel of the future. I'm sorry for taking so much time.

Ms. LOFGREN. Thank you.

Mr. MITCHELL. Could I add a comment to that? I guess I disagree. I don't think American firms are shortsighted in any particular sense, other than to the extent that government policy drives them that way and drives them away from taking risk.

Investors don't like risk just for the sake of risk. They like risk when they have an expected return that is associated accordingly with that risk.

But what is that expected return? That's not the amount, the gross return. It's the after-tax return. And when we level as many as four layers of taxes, as I said before, on the return, by definition, the tax code is not only punishing investment and innovation generally, but it is particularly punishing investments that are high-risk, high-return.

And so, I don't blame American businesses or American investors for being short-sighted. I blame the government policies, particularly tax policy, that drive them in that direction.

Mr. GUTKNECHT. Mr. Mitchell, could I get in here, because I generally support the tax credit notion. At least I did until just a few minutes ago, because something was said that I think is an important point. And that is that the time horizon for American business is much shorter than Japanese.

And I think that's driven in part by investors' expectation, which in part is affected by tax policy.

I wonder if you could comment. Wouldn't it be smarter—I'm just throwing this out. I'm thinking out loud, to a certain degree.

Wouldn't it be smarter to lower the capital gains tax and encourage investors to think long-term, rather than the tax credit, which is now shortening depreciation schedules, which are now getting people to think more long-term? Would you respond to that?

Mr. MITCHELL. I would respond that the maximum capital gains tax in Japan is five percent. The maximum long-term capital gains tax in Germany is zero, Hong Kong zero, Singapore zero.

We're sort of an anomaly in the industrialized world in the way we treat capital gains. But it goes way beyond capital gains.

The research and development tax credit is in the law, I think, precisely because we need some way of encouraging investment and innovation precisely because the rest of the tax code penalizes it so heavily.

If we had a tax system that taxed all income, but only once, something like the Halver-Bushca model flat tax, I don't think you would need an R&D tax credit because no longer would you have four layers of tax and theory on the same dollar of income.

It's very, very common to have the two and three layers of tax, and if you're a successful entrepreneur, you want to leave something for your kids.

You might as well stop working when you're 50 or something because every dollar that you take in is going to be taxed at about an 80-percent rate when you add all the different taxes together.

So, yes, look at Germany and Japan and other countries as an example of why are they more long-sighted, at least in the popular press?

It's not because there is something more innately intelligent and wise about them. It's just they're responding to the incentives that are in their own government policies.

Mr. GUTKNECHT. Does somebody else want to comment on that? I wanted to go to Mr. Tiahrt.

Mr. Greene?

Mr. GREENE. I'd just like to follow up on the issue of the credit.

It seems to me that the R&D credit is doing exactly as the gentleman says, that it is incenting people to take more risk and do research and development.

But you have to understand the competitiveness issue of country to country.

For me, the key element of all of this is that the developing world is attracting manufacturing. It's attracting American companies and other companies from around the world to come in, develop the markets, develop products in those areas, and they're going to be competing for our research and development dollar.

This country, if it wants to succeed and sustain its research and development, has to respond to that and it has to respond to that with incentives to make these companies want to do it here when they come to the point where they're under pressure to move overseas by both tax incentives and also market opportunities which are linked to the desire of those companies to have high technology in them.

So from my perspective, it's a very important, competitive element for the United States to recognize the need for incentives for research and development.

Mr. GUTKNECHT. But are you saying that they do offer research and development tax credits in some of these other countries?

Mr. GREENE. Some of them have credits, accelerated depreciation, various incentives to attract research and development to those countries.

Mr. GUTKNECHT. And lower long-term capital gains tax.

Mr. GREENE. That's correct.

Mr. GUTKNECHT. Okay. Yes?

Dr. WYCKOFF. I just wanted to speak briefly on the R&E tax credit because we completed and released a report on that at the request of Congresswoman Morella and Senator Hatch this Monday. We looked specifically at the operation of this tax credit over the 20 years, basically, that it's been in operation.

And what we found was exactly what's being told you here, is that it worked reasonably well at incenting incrementing R&D above and beyond what would have otherwise been done.

I think it's important that I tell you that the type of R&D that it generates tends to be more of what the company was already doing. It doesn't really change the allocation of the R&D.

So going back to the earlier question, if your intent is to try to do more blue sky or basic research type R&D, this tool won't necessarily reallocate the R&D to that end.

Rather, it tends to be more applying developmental R&D which is of a direct interest to the firm undertaking it. And only about eight percent of the U.S. basic R&D is done by industry at this time.

We also looked at the international component of this, what some of the other countries were doing. It's in the report. And we concluded, and it wasn't just OTA, of course. It went through the normal process of hiring a contractor, holding a workshop with industry, government, and academia. And then submitting this report for extensive review.

We concluded that the international element here was not a decisive factor. That is, the R&E tax credit was not a decisive factor in where firms located to do their R&D at this time.

Mrs. MORELLA. I thank you for the response. And Mr. Tiahrt is next for questioning.

Mr. TIAHRT. Thank you, Madam Chairman.

I want to come back to that tax credit after a while, but I have one question I want to get in, in case we have to leave for a vote. I've heard one may be coming up shortly.

Vice President Gore recently released a national performance review and in that, he talked about the Department of Energy's environmental management group and the problems that they're having.

They're missing about 20 percent of their milestones, which means they're behind schedule. They're about 40-percent inefficient, according to this survey, which means they could cost taxpayers $70 billion over the next 30 years.

So, we're constantly looking for opportunities in new technology. We all want a safe environment. We don't seem to be coming up with a whole lot of new ideas inside the government.

Dr. Kapper, I know that Corning is working a new process called glass vitrification, I believe it is. I wonder if you could talk to us, describe the process briefly and tell us how it turns hazardous material into nonhazardous material. And also, attempts that your company has made to commercialize it.

Dr. KAPPER. Yes. Basically, what Corning developed, and it's our coal crown glass manufacturing process.

Basically, what we've done is take hazardous waste and convert it into a single-phase glass, where all of the heavy metal such as lead, cadmium, arsenic, et cetera, is chemically bound with another element and as a consequence, it can pass the toxic characteristic leaching procedure test with no problem at all.

And in point of fact, some of the tests we've run could beat the TCLP test probably at least twice or three times.

The basic problem that we ran into was when we spoke with the EPA, who was very helpful at the time, was that the delisting regulations, which are specified in Title 40, Sections 260.20 and 260.22, was basically that the delisting process takes years.

The administrative and the experimental hurdles that are laid out in the document itself of the delisting document—for example,

there's only about two or three pages that cover the two sections that I mentioned. This is a delisting manual.

We've gone through that and even for the very simplest delisting, which is a rule-making procedure, it takes about two years, and that's the best. And we figured it would take us about eight years.

The second impediment, and it's a major impediment, I think is the potential liability that Corning or any company would have as a designer, operator of, in this case, hazardous waste reduction plan.

What we've done, for example, this is a former hazardous piece of waste, okay? And one of the things that we wanted to do in terms of commercializing it and making it pay for itself, so to speak, was to make products out of this formerly hazardous waste.

You know, for example, use it for road-building, for bricks and blocks and so on.

We were told when we discussed this with the EPA that if you don't plan on putting it into a waste site, you'll have to go ten to a hundred orders of magnitude more stringent testing. I think that kills it.

So I think, from our standpoint, and I think from a lot of standpoints of companies wanting to get into this area, number one, it's the potential liability that you face. And this is not insignificant.

The other thing I think are the administrative and, in this particular case, experimental hurdles that have to be jumped over. And as I say, in our particular case, and this is a specific one, where we now have to go to two or three orders of magnitude more stringent.

You can take this, and I don't know if you're familiar with how the TCLP tests are run. They basically grind this up into almost sand size and then they treat it with acid and then you see what is leached out of it. Nothing's leached out of it relative to the particular standards that are set, at least to be hazardous waste.

But when you start going down to two or three orders of sensitivity, then that's where it becomes commercially unfeasible.

Mr. TIAHRT. You've given me several different obstacles we have to overcome. Not only potential liability, the regulatory problem. But we're also trying to put in place an incentive structure.

I think corporations and Americans in general react much better to a carrot rather than a club, as the Speaker has often said, the Speaker of the House.

And I think what we're looking for is a way to come up with a carrot, to come up with new technology, to put a structure in place so that it's open, that we have these incentives, I guess, as a good way to kind of capsulize it all together.

And we're experimenting with thoughts like flat tax, which would do away with the R&D incentives. And I think I got mixed signals there on the panel, whether we do away with R&D, whether it be good—Mr. Wyckoff I think was saying that we need to pursue it, or there's no clear message that R&D tax advantages cause companies to move to that area.

Is that correct? As far as moving their research and development facilities to a specific area.

A flat tax would do away with any incentives on research and development other than a zero capital gains tax.

Would that be sufficient to encourage companies to continue with research and development? Or would that be an obstacle for expanding research and development, so that we can develop new technologies like—I call it glass vitrification. You call it something else, I guess.

But I want to open it up in general and perhaps Mr. Greene can start it off.

But is a flat tax, where we have zero capital gains, no incentives for research and development, going to be an obstacle, or would that help the process of developing new technologies?

Mr. GREENE. And you mean where there's no research and development credit or any other specific incentives?

Mr. TIAHRT. Other than just a zero capital gains tax.

Mr. GREENE. Other than zero capital gains tax?

Well, certainly, zero capital gains tax will open up the capital markets for people to make investments for a long-term return and incent certainly early research and development, in my opinion.

I think it's harder to see the impact on major corporations that are already well established. And I think that there, the removal of incentives for research and development will have a negative impact on research and development.

So a flat tax, in my opinion, helps, with the special capital gains provision, helps on group, but may not help the other group.

Mr. MITCHELL. The capital gains tax really goes beyond what you described because there's immediate first-year expensing of all equipment and land purchases, instead of being forced to depreciate over several years, which means you don't capture the present value of that investment.

You no longer have the double-taxation of dividend income. You no longer have multiple-taxation, as represented by transfer taxes to get the estate tax.

And I imagine if you went to 99 out of 100 investors, that would be putting the money into businesses and you offered them a trade—we'll get rid of the current system, including the R&D tax credit, and we'll give you a system that taxes income only once at a low rate, with all the features that I described—they would gladly make that trade.

I'd be shocked at who the one out of a hundred would be that wouldn't grab that trade.

Dr. GIORDAN. I'm certainly not a tax expert, and obviously, we have other people here who are. But I can speak to this from a research perspective, as a vice president of research in a multi-national, although I am not here to represent it as a multi-national, per se.

I tend to lean where Mr. Greene is, that, certainly, from a tax perspective, everyone is going to want to make more money. Whether or not this would actually help, however, research and development is another issue.

I believe, and I'm very concerned about this, that in large companies today, the incentive is not necessarily to, in quotes, invest in new technology to build and open new markets, as much as the preservation of wealth in terms of sharing it among what companies currently have large options, large market shares in those.

It's a game right now of raw material costs. Most of us who are special to chemical manufacturers know that, on average, raw material costs are running at around the 50 to 51 percent range. That's a huge number.

If you throw on top of that manufacturing costs, that ranges, depending upon if it's a large-scale commodity to a smaller product size. But it can go anywhere from, let's say, another ten percent, rough numbers, to another 25 to 30 percent. You're talking very small margins right there.

So what you're really talking about in large companies I'm concerned about today, is the redistribution of wealth. It's almost like litigation in its own way.

On the other hand, opportunities to incent what I've mentioned before as an innovation process, the creation of technology, be it through federal labs, be it through the private sector, in small companies that can then be purchased by large companies at a lower level of risk, as well as the opportunity for that small company that is started—a couple of professors got together with a big company and made it happen—to allow them to expand and grow, those sorts of things in terms of tax credits to, say, big companies like Corning or Eastman or Henkel, could work with universities to create small companies and let them grow, that I think is an important issue, including for jobs because if we see the statistics, and you certainly know that better than I, small companies are the ones that tend to grow.

We, unfortunately—well, our company is not letting people go right now, but we, as the large companies in general, are at large fault right now for letting people go and not for growing.

So I believe that there's got to be this balance of incenting smaller companies to grow and giving us opportunities to then move on with them. Taxation will help companies in general, but not necessarily innovation.

Mr. TIAHRT. Thank you very much.

Mrs. MORELLA. I thank the panel. I was going to defer to the Ranking Member because he passed the last time and I know he's got another meeting—Ms. Johnson, Mr. McHale, Mr. Ehlers, if you don't mind.

Mr. TANNER. Thank you, Madam Chairwoman. I'm sorry. I do have another meeting. But this has been a very interesting discussion and I appreciate all you panelists, your time, expense, and trouble to get here. We appreciate it, and it's very helpful to the process.

Dr. Lenard, on page 5 of your testimony, I was noticing you refer to the product olestra and you seem to draw a conclusion to the fact that the manufacturer of this product has spent $100 million before making a single sale has not gone unnoticed by others contemplating similar R&D efforts, and so forth. And you talk about the FDA has been deciding what to do with the fat substitute for over 20 years.

I know that Procter & Gamble has contacted your office and provided you with additional information about the product olestra and about the fact that it was a new product and there was some grave concern about the fact that vitamins are not soluable—or are fat-soluable and olestra was a new product that was a substitute

fat and that they themselves said that the cumbersome FDA administration process was not the core matter in the approval of this product. There had to be new protocols and so forth.

And so your conclusion here, although there's a lot to criticize, I'm afraid in this particular instance, Congress did approve in 1993, an extension of the patent process for the reason that this demanded new protocol and so forth.

I'd just point this out, that given the fact that there's plenty of ammunition around here to criticize, I would hate for somebody who read this to draw the conclusion that the FDA was the sole reason why olestra is not on the market.

The fact that it's not is going to prohibit someone else from pursuing that new technology. Now a question for all of you, if I may.

Will the financial benefits resulting from proposed changes in federal tax, legal and regulatory policy provide an adequate substitute for federal programs that provide direct support, either in a partnership situation or otherwise, for long-term, blue-sky, high-risk, generational break-through research and development, in your opinion?

Mr. GREENE. In my view, there's a need for both. There is, in my view, certain projects that industry may not be incented by economics or by tax credits to undertake, and therefore, there is a role for government to fund certain research and development projects that really are off the charts in terms of what industry is willing to take.

On the other hand, I don't believe the government can foresee all of the industry opportunities that exist out there and therefore, the law must contain incentives for people to make their own decisions about where research should be undertaken. So I think that there's a need for both.

Mr. TANNER. I happen to favor requiring the private sector to put up some of their money when they want the government to put up money in terms of some of this long-term research. Is that a good idea, in your opinion?

Mr. GREENE. I believe in many cases they do.

Mr. TANNER. To make a partnership.

Mr. GREENE. I believe in many cases they do.

Mr. TANNER. Anyone?

Dr. GARNER. I too agree that there is a place for funding from both the private sector as well as the government.

In Zeneca, we spend about $700 million a year on research world-wide. Yet, we know that we can't do all of the research that we need to as far as new product development.

We go outside of our company. We go to universities. I'm even talking with the University of Tennessee right now about some technology.

So it's a source for us to get technology that we know that we can invent and create all of it in-house. It's a mechanism for us to go outside.

And the funds that are spent at the universities in this country, research by the Federal Government, certainly help benefit society in general.

That's not even to mention the human genome project, which is such a huge project in the genetic area and medical diagnostics.

That's certainly an area that could not be supported by any one company.

Dr. WYCKOFF. I would just repeat my earlier statement that we did not find them in our analysis to be directly substitutable. They serve different functions, both of which are very worthy.

I would also point out that, currently, the way the tax credit claims are coming in, they only represent about six percent of the total federal R&D. So there's a much different scale as well.

Mr. MITCHELL. The only note that I would add, that you have to really define what you're talking about subsidizing, whether it's a public good or not.

If something is a purely commercial enterprise, then I would disagree. I don't see any need for government research, particularly if we move to a tax policy that stops discouraging people from making those long-term investments.

But, obviously, if something's a public good, and the easy definition, obviously, is some piece of military technology, then a private firm isn't going to develop that unless they know that there's either a government contract or a government subsidy for doing so.

The interesting question, of course, is what is a public good, once you get beyond defense and a couple of other easy answers.

Mr. TANNER. Well, would economic competitiveness in an international market place by an American firm be a public good, in your definition?

Mr. MITCHELL. It's a very desirable thing. It's not a public good, in the strict economic definition. A public good simply refers to something where the benefits can't be captured by the person developing them where there's not a properly assigned property right.

Clean air is a public good, but obviously, without—that's an area where government has a legitimate role because no one owns the air, so no one can sort of sue for damages if someone's polluting the air.

But in terms of economic competitiveness, that's obviously something very desirable. But I think it comes about from the proper policies and right now I think the government, at least in the tax field, which is my area, is not exactly being a tremendous help.

Mr. TANNER. So you think that changing the tax policy to conform to your idea of what it should be would do away with the necessity of any sort of long-term government activity, federal labs and so forth, in research?

Mr. MITCHELL. It would do away with the need for any sort of government research, absent area of public good. And again, I'm not going to pretend that I have the easy and complete definition for what is a public good.

I imagine that there are probably parts of national labs that I'm sure fit into that category and there are probably parts that go outside of that area. I'll confess that that's not something I've particularly looked at.

Mr. TANNER. Would university research be considered a public good under your definition?

Mr. MITCHELL. Some of it is and some of it is not.

Dr. KAPPER. Can I make a point?

Mrs. MORELLA. Dr. Kapper, I think, wants to make a point.

Dr. KAPPER. Excuse me. I'd just like to make a point. I think that government support of research and development, particularly in the colleges and universities, is extremely important to manufacturing companies. Where do we get our scientists? Where do we get our engineers?

We don't pay for them in the sense of their training. That's where the government, I think, has a vital role to play. And again, although it was perhaps glossed over, militarily critical technology development is vital for the operational forces. And a lot of that doesn't result in an immediate product. And as a consequence, the timeline may be much longer.

And I think there are criteria for government to be involved and not to be involved. But, certainly, we have to consider the fact that companies such as our own really needs the kind of trained scientists, particularly those that have inter-disciplinary training. And government does fund that kind of research in universities and colleges.

Mrs. MORELLA. I'm now going to turn for questioning to Dr. Ehlers, who is our physicist.

Mr. EHLERS. Thank you, Madam Chair. That plus a dollar will get you a cup of coffee downstairs.

I would like to follow up what we just heard discussed. I have a deep concern about the research base of this country and what's happening to it.

In my experience, the economic base of what we are doing now derives from research which was done from three to five decades ago, much of that funded by the government because the pay-off is long-term and most companies cannot invest in something like that.

There were a few exceptions. Bell Labs has done a fair amount of very good research over the years, won a number of Nobel Prizes, and that's provided a good deal of the economic base of our nation, and of AT&T, for that matter.

But even that's disappearing now, first with the original break-up of AT&T, and now further break-up. And I think Bell Labs is going to be hurt by that.

Similarly, IBM research labs and Xerox research labs tends to be less oriented that way.

It seems to me that more and more, the industry is looking at the bottom line on a very short-term basis. In fact, sometimes as short as one quarter.

Part of that is all the buy-outs that have occurred in the past decade or two, and that's totally changed the economics.

I am familiar with companies where the research is basically cut to zero in order to make the company appear profitable for a short-term sale. And then the company which purchased it tried to build it up, but that's an impossible thing to do on a very quick action.

What I'm saying in a rambling fashion is that, at the same time the government is trying to cut the deficit and we are cutting back on basic research, which is the real foundation of economic development in the future, I also see corporate America cutting back, not so much perhaps on the money spent on research, but on the pay-off time that they are willing to accept, or that they are looking for in their research.

And that, I fear, is going to be as deleterious to our children and grandchildren as our ever-mounting national debt is. And I'm terribly concerned about the national debt and I'm dedicated to balancing the budget. And I think it's absolutely essential.

But I also think that, long term, in fairness to our children and grandchildren, we have to maintain our research effort because that is going to be what provides some jobs down the line.

We've heard discussion here about research and development tax credit. That's one method of trying to encourage research, but it says nothing about the timeline of the research and the nature of the research.

I'd be interested in comments from the panel, particularly those from the industry side, but I ask anyone to feel free to respond.

How can we, as a government, if we can, how can we deal with this in some reasonable fashion to ensure that this country continues to do the research necessary to develop the economic base that we need in the future?

Dr. Giordan?

Dr. GIORDAN. There are a few points. Number one, let's talk about the type of funding that the Federal Government currently gives to the research enterprise.

Number one, university funding, through myriads of sources such as NSF, NIH, DOE, DOD, you know them better than I.

I think it's critically important for us to maintain that very strong research base for two reasons. Number one, the training of future scientists, which has already been brought up, which is very important. But our taxes don't have to train future people. That's not what our taxes necessarily only have to do.

The other point, though, is sustained economic development and sustained economic growth.

Without well-trained people into the future, the concern I brought up before about the have and have-nots technologically, the ability to participate fully in industry and into the future becomes very, very dangerous. We have many, many people who simply can't participate.

So we need to continue to fund university research in a very strong way, both for the training aspects, as well as for the sustainable competitive advantage aspects.

In addition, university funding right now is for broad-based scientific research. I believe very strongly that that needs to continue. The ACS believes that. Of course, we are on record in saying that.

We also need to take a look at other opportunities, I would like to suggest, that funds research that works—and this is sort of part 2 of the university research—that works in conjunction with industries, both small companies for start-ups, as well as larger companies—where, yes, industry does have to participate. We don't want a free lunch because, in the end, we can't own the technology to commercialize it. That's the intellectual property issues.

But we need to look at opportunities to jointly fund high-risk, longer-term ventures, because I couldn't agree with you more, except I'll take issue with your quarterly view. Some of us have a monthly view on how the P&L has got to look. If not, we're in trouble. It almost gets daily sometimes. So absolutely, the government needs to play that role.

A second way that the government funds that we need to take a very careful look at, and I know that this is a very touchy subject, is the government labs.

I believe that the government labs have done wonderful things in the past and can continue to do wonderful things in the future.

But in this very tenuous time of trying to balance the budget, which we all know has to happen, the bubble is going to give somewhere. You can't keep printing the stuff in the basement.

And so, basically, where it comes out, I would like to suggest, is we need to take a very hard and very critical look at how much money we are spending in federal labs, making sure that they are truly appropriate programs and focusing that opportunity on longer-term, not short-term, quick product development.

And last but not least, in terms of the types of monies we spend to support industrial research or incent industrial research, I'd like to suggest that if we use tax as an opportunity, or anything, we need to incent longer-term research.

What has been happening, and we all know this, and I'm certain Dr. Wyckoff can give better data to this than I can, is that in our intense drive to have specialty chemicals and pseudo-value-add, what we've done is become more product development-driven, more tech service-driven.

And I couldn't agree with you more that while our numbers in R&D may not be changing a great deal, although they are going down somewhat, the focus is quite different.

It's on short-term, quick-term needs. It's not on the long-term, big-term developments.

And I'd like to suggest that anything the government can do to incent the longer-term capital gains, all of those issues, that's critically important in any funding you would give to industry.

Mr. EHLERS. That's a very good answer. But I guess my next question, and maybe this should go to the tax experts—what assurance is there that repealing the capital gains tax, which I happen to favor, will provide for longer-term research, as opposed to the shorter-term research?

Dr. GIORDAN. I don't believe, as I mentioned before, as I gave an answer before, I don't believe that, in and of itself, that alone will. You need other very specific pieces in there.

Companies are wonderful at maximizing opportunity any way they can maximize it, and they don't necessarily see longer-term R&D as that opportunity right now. Quite unfortunately.

Mr. EHLERS. Good. Thank you very much. Are there any others?

Dr. LENARD. I was going to address not the capital gains issue, but an issue related to your initial question about the timeline of investment and its relation to regulatory issues.

I'm a supporter of basic research and I think the government should support basic research. I think that is consistent with what Mr. Mitchell was saying about research as a public good which would not be done otherwise.

I don't think it's an appropriate function for the government to support applied research. But with respect to the R&D projects that private companies undertaken, the evidence is in many of these areas—food and drug and other areas—the timeline to de-

velop a product has increased dramatically and a significant element of that is the regulatory hurdles that are put in its place.

So, obviously, if you rationalize the regulatory process, you are going to appreciably diminish the amount of time that it takes to bring a product to market. That's going to provide a very strong incentive for more R&D into those products, and that's, I think, part of the solution right there.

Mr. MITCHELL. If I could just add. I thought you were making an argument for the flat tax when you were asking your question.

You were complaining about the high amount of debt that was taken on in some of these buy-outs while our current tax system favors debt over equity. When you worry about the timeline and how short-term focused American companies or investors may be, that is driven overwhelmingly by the tax code.

When you're not allowed to recapture the full value of investments you make, when you're double, triple, and sometimes quadruple-taxing income that comes from investment, I think that clearly has an effect.

And when you're levying those high levels of taxes, you also drive people toward safer investments.

So whether it's your time horizon, whether it's your risk return ratio, or whether or not it's saddling yourself with too much debt, those are all problems that—not totally, I'm sure, but at least in part—are driven by our current tax code.

All three of those problems would be taken care of by moving to a neutral, unbiased tax system such as a flat tax.

Mr. EHLERS. There would be other systems besides the flat tax that could accomplish the same thing.

Correct?

Mr. MITCHELL. If you got rid of all the current income tax system and replaced it with a pure value-added tax, you could capture all the same economic benefits.

I'm a little bit skeptical as to whether Congress would actually completely repeal the income tax, the 16th amendment, and everything that goes along with it, which is why I tend to think that the flat tax is a safer route to reach those same goals.

Mr. EHLERS. Yes, Dr. Garner?

Dr. GARNER. In the pharmaceutical area, which is one of our significant businesses within Zeneca, I think the average time right now is about 12 years to bring a product to market, and it costs close to $400 million.

That's not going to be, I don't believe, as impacted as much by taxation issues as it is by regulatory issues.

Certainly, we would love to see streamlining of a system that would allow us to bring safe, efficacious products to market in a shorter time period.

So, in that area, we certainly would see the regulatory issues as being a significant barrier. But I think it also makes a statement that private companies are in long-term research, that we have made significant commitments to long-term. But I would like to add just one comment.

You mentioned earlier about our base of knowledge building on what we were learning 30 and 40 years ago.

I think in the biological sciences now, that's changing significantly. I think we're starting to turn over the knowledge now on maybe a decade period. It's just moving so rapidly now that it's staggering. It's very difficult to keep up.

Mr. EHLERS. That's probably because the biological sciences are so much easier to understand than the physical ones.

Dr. GARNER. I always thought so, yes, sir.

[Laughter.]

Mr. EHLERS. Thank you. Yes, Mr. Greene?

Mr. GREENE. I'd just like to add that we seem to be putting a lot of emphasis on the short-term nature thinking of U.S. companies.

It appears to me that the real driver here is the growing worldwide competition that is putting many companies under price and profit pressure, which forces them to refocus their businesses to be more short-term-oriented and to be successful in the market place from a price-competitive perspective. And that's not going to change, and that's going to grow.

It appears to me that the emphasis on long-term research will always be there, provided the companies can remain profitable and successful.

So short-term research necessary to support new product development to sustain profitability is equally important to long-term research, which produces the new products down the road.

And I think it's important for the government to incent companies to join together to share the longer-risk projects, working with universities to build a whole research and development community in the United States and sustain that over a longer period of time.

So we support long-term tax incentives and credits for that kind of behavior.

It seems to me that we right now in Kodak invest over 90 percent of our research dollar in the United States. Over time, we're going to be under pressure to move some of that to other countries.

We need the economic elements that will help us make those decisions logically and keep that research and development in the United States.

Mr. EHLERS. One possibility I thought of is having the R&D tax credit or something equivalent apply in spades to money that corporations will give to universities to conduct basic research, not necessarily directly related to the goals of the company. And that might be better in some cases than the Federal Government providing it.

Thank you. Does anyone else wish to respond?

[No response.]

Mr. EHLERS. Thank you, Madam Chair.

Mrs. MORELLA. I would ask the patient Ms. Johnson for any questions she may have, and then we'll follow with Mr. McHale.

Ms. JOHNSON. Thank you very much, Madam Chairman. Let me start by saying, I recently visited a number of various companies in my district. The one that was quite interesting in their presentation was Hitachi, that has several manufacturing plants, but all of their R&D is done in Japan.

I asked them why, and also asked what their reaction was to our cutting of the partnership-type programs.

His reply was that they got better support from their own government in their R&D, and that their reaction to what we were doing in cutting was great news for them because it would put them out front with their assistance that they received back there and the competitiveness would change tremendously.

Do you feel the same way or is there some opinion related to that opinion?

Mr. GREENE. Are you speaking specifically to the Hitachi situation?

Ms. JOHNSON. And companies like that.

Mr. GREENE. I believe Japan has always supported its industry. It has a very close relationship between government and industry to incent that kind of behavior. And that's why we're here today, is to work with the U.S. Government to get the same kind of support for developments here in the United States.

So I think those behaviors are going on overseas in many countries and the countries are trying to attract and retain research and development in their countries. And the less developed countries are going to be moving for that.

There was some recent announcements about IBM doing some development in China. Motorola is moving very heavily in China and growing all the time.

So I think those pressures are going to be there and we're going to have to - the U.S., the country, the United States, is going to work very hard to remain competitive.

Ms. JOHNSON. Now, what factors does your various firms take into consideration, into account, when they are determining their R&D budgets?

Mr. GREENE. Well, you talk about in terms of the total dollars we spend?

Ms. JOHNSON. Yes.

Mr. GREENE. Well, obviously, we look at the needs of the company in terms of product development. That's a primary factor. Also, the profitability of the company and the ability to afford certain research and development is also a factor in those decisions.

So it's a compound problem that involves both product needs, as well as the needs to sustain the profitability of the success of the corporation.

Ms. JOHNSON. Any others?

Dr. GARNER. We also look at, because we're multi-national, at the best resource allocation as far as the research. Where is the best place to do the research, and not only what research needs to be done, short-term, as well as long-term.

We are concerned with not just products this year or next year. We're considering five years down the road, ten years down the road, that type of a pipeline.

All of those factors are discussed and all those issues are thought through when deciding what research and where the research needs to be placed and what the focus is.

The one thing that has been discussed and is a given in our company is that research is the lifeblood of our company. We're a bioscience company and we will do research.

So after that, then it's all these other factors that have to be taken into play as to where the research and what research is being done.

Ms. JOHNSON. Now, I have a large medical school in my district, the University of Texas, Southwestern Medical School, and we have a Nobel Prize Winner in pharmaceutical research there. I visit periodically and see the value of that research and how it is parlayed with private industry to produce the products when it finally comes through FDA, and how also it impacts the quality of life and actually the lifespan.

As a pharmaceutical products company, I know that your cost probably is recovered in the first four or five years of your product.

Without this kind of assistance, do you anticipate that you would put a great deal more money into that basic research, or how would you react to the change?

Dr. GARNER. I'm sorry. I wasn't real clear on exactly what change.

Ms. JOHNSON. In the support from public dollars.

Dr. GARNER. A significant amount of our research and our product pipeline is internal, where we funded it ourselves through—last year, I think it was about $700 million in research we spent ourselves.

So most of our research pipeline comes from that, as opposed to bringing on the technology from public dollars spent.

However, when we do bring on technology, in general, there's also a significant burden from the company to take that in its early stages through to product.

Again, in the pharmaceutical area, I think the industry standards is about a 12-year time period and close to $400 million to develop a new drug product.

That is not all done at the university before they turn that product over to a company. The major burden is on the company. And that's a significant relationship that companies can have and do have with researchers that actually benefit both significantly.

Ms. JOHNSON. So with your company, the tax benefits and regulatory relief is all that you would be supportive.

Dr. GARNER. We would certainly welcome relief in those areas, especially in the regulatory area as well.

Ms. JOHNSON. Okay. Now, how would you define the basic research? And what proportion of your firm's R&D budget could be characterized as your basic research?

Dr. GARNER. We spend 12 percent of our gross sales on research, as of—that was 1994. We have about 7000 people conducting research. About a fourth of those are in the U.S. And again, they're spread across our three primary business areas—the pharmaceuticals, agricultural-, chemical-type products, as well as specialty bio-tech-type of products.

Ms. JOHNSON. Okay. Any other comment from any other panel member?

[No response.]

Mrs. MORELLA. Didn't you want to respond, Dr. Lenard, to a previous question?

Dr. LENARD. Well, I was just going to make a comment about the international competitive issue as it relates to medical products.

Increasingly, as a result of our regulatory system, we do see medical products companies, and this is especially striking in the medical devices area, moving overseas, primarily to Europe, because of the difficulties of introducing products into the U.S. market.

For example, the president of one of the largest medical device companies responsible for development of pacemaker technology announced that his company has moved all its R&D to Europe and all of its projects are being done there and all of its products are being introduced in Europe before they're introduced here and are available to patients there before they are here.

Ms. JOHNSON. One last question. There's been great debate on the limitation of liability with companies wanting to be rid of the liability once the product is approved by FDA.

If the process is speeded up, do you think the companies are willing to maintain liability for a longer period?

Dr. LENARD. Well, I can't speak for the companies, but I think if you go through a rigorous process—even if this process is speeded up, that doesn't necessarily mean the standards are diminished. And if you have a process that basically is a stringent process and gets you to the type of risk level that you want to get to, it seems to me perfectly appropriate to have a regulatory compliance defense that companies have met those requirements should have the benefit of a regulatory compliance defense.

Ms. JOHNSON. I don't mean that the quality of that process would be diminished. I'm thinking about the longer period of testing of the product.

Sometimes products can be used by a person participating in research for a year and other times five years. And what happens the first year might be quite different than what happens the fifth year. It was to that end which I had reference to.

Dr. LENARD. Well, I think these defenses would always be subject to what the state of knowledge is at the time and what information is available about the effects of the particular product and how the company has appropriately dealt with that information.

Ms. JOHNSON. Thank you.

Mrs. MORELLA. Thank you. Mr. McHale, you may have as much time as you need, since you have so patiently waited.

Mr. MCHALE. Thank you, Madam Chair. What time is dinner?

[Laughter.]

Mrs. MORELLA. Whenever you cook it.

[Laughter.]

Mr. MCHALE. Believe me, you don't want that. Madam Chair, thank you. Listening to the testimony over the last several hours and the detailed discussion of the Internal Revenue Code, I thought perhaps I had wandered into the Ways and Means Committee inadvertently.

But I think the testimony and what I believe to be up to this point the incisive questioning really did establish the linkage between the incentives provided in the Internal Revenue Code and the commercial decision to make certain investments in support of research and development.

And that's really where I'm headed with perhaps my one or very few questions related to one topic regarding potential incentives that we would incorporate into public policy, particularly within

the Internal Revenue Code, to encourage long-term investment in research and development.

And as I've listened to the testimony over the last several hours, a number of dichotomies have emerged, competing, to some degree.

First of all, I think Mr. Mitchell has focused primarily on a generic short-term need to reduce or eliminate the capital gains tax.

Others have emphasized the need for longer-term investment, where perhaps that investment would be targeted, not simply at all capital assets, but specifically research and development.

And implicit in some of the comments were the distinction between corporate investment in long-term R&D, encouraged, for instance, by the tax credit, and what I'm thinking of now in terms of external third-party capital investments in long-term R&D. Let me give you a specific example and then ask for your comments. Earlier this week, I had lunch with the chamber of commerce. I happened to be seated next to a banker, and seated next to him was a businessman.

The banker turned to me and said, Paul, we absolutely must cut the capital gains tax, words that I think Mr. Mitchell would heartily approve. He said, what I would advocate, and this is really almost tangential to my question, but he said, what I would advocate would be a 50-percent reduction in the capital gains tax for a two-year period of time in order to break the logjam of capital ownership, on properties that are being retained simply because the owners fear the realization of a profit and the imposition of unacceptable taxation.

Well, the businessman said, well, I own a multi-million dollar housing project. If you gave me a 50-percent cut in the capital gains tax, let's say for a two-year period of time, I would sell that property. I would realize a profit and I'd be willing to pay a 50-percent reduced capital gains tax.

My question to you is this. While we want to encourage corporate investment through the tax credit, for instance, in long-term R&D, is there something that we should do to encourage that businessman who has, for instance, by a 50-percent reduction of the capital gains tax, incurred or realized a profit? Is there something that we want to do in the tax code that would say to him, assuming we don't go to a zero-percent capital gains tax, we will give you even more beneficial tax treatment if you take that profit you have realized through the sale of your housing project, your housing property, your real estate, if you take that and invest it for a ten-year period of time, we will give you a zero-percent capital gains tax, so that at the conclusion of that secondary investment, we've freed up the capital in the private market, you're putting it back into long-term R&D, and at the end of that process, you walk home with every penny of profit you have earned on the initial investment in that which you have reinvested.

Does that seem like a reasonable step, basically to say to him, sell your real estate, plug the money back into a long-term investment in R&D, and when ultimately you realize your profit, you walk home with every penny of it?

And if that does seem to be a reasonable step in order to encourage third-party investment in long-term R&D, not just corporate investment in long-term R&D, where should he put that money?

Where could he put his $3 or $4 million in profit that would benefit to the maximum degree the advance of long-term research and development? Long question, but for me, it's one that's important.

Mr. MITCHELL. I don't think that there's anything necessarily inconsistent between the goals that you have and the kind of results that would result from a neutral tax system that did not penalize savings and investment in the way it does now.

I mean, you can set up a structure that would require some compliance costs and monitoring by the government in terms of are you reinvesting? Did you hold it for ten years? And you'd have people fighting and lobbying over exactly how that was structured.

On the other hand, if you just set up something like a flat tax—one thing that investors are always looking for, the whole Wall Street Journal is filled with advertisements on this basis, is they're looking for the highest rate of return. And if the highest rate of return is in a long-term investment, you don't need to specifically set up a structure that's going to reward someone for that because the reward is the fact that they'll get the better return that would come about from such a system.

I don't want to repeat myself, but I have a lot of faith that if we get rid of the biases against equity, if we get rid of the biases against risk, and if we get rid of the biases against long-term investment that are currently woven throughout our tax code, I don't know that it would be necessary, then, to add extra inducements on top of that.

Let's at least take that step to get rid of the bias.

Mr. MCHALE. I understand what you're saying. If we went to a zero-percent capital gains tax, obviously my question is moot. And I guess really the premise of my question is I don't think we will go to a zero-percent capital gains tax, putting aside the merit of that proposal.

And so if we don't go to a zero-percent capital gains tax, how can we make it attractive for that potential investor to put the money, for instance, into long-term R&D, rather than the purchase of a summer home?

Mr. MITCHELL. Assuming that the investor, as I said before, is looking for the highest rate of return, they're going to put it in a long-term investment, if that's where that rate of return is. They're going to put it in a short-term investment if that's where the rate of return is.

Unless for some reason we believe that investors market-wide are misinformed and we think that we know better than them, I don't know that you need to put some sort of special inducement in, particularly when you're talking about the capital gains tax.

I think zero is better than cut in half. But even if it's cut in half, you have a lot of people who would put money into a high-risk venture where they know they're not going to get any stream of dividends anywhere in the near future.

One of the reasons that they're doing that is the expectation, the hope, that the company will rise in value as investors re-assess what the long-term prospects of getting income from that company are.

Mr. MCHALE. I understand.

Mr. MITCHELL. So I don't know that extra inducements are needed, so long as you fix the underlying problems.

Mr. MCHALE. We've gone at some length here. If those inducements were appropriate, and let's say that the premise of my question is, for the sake of analysis, correct. And I understand your point of view, Mr. Mitchell.

If the incentive would shape his conduct in terms of where he would put that money, and we want to guide him toward long-term savings and investment rather than consumption, not penalizing one, but also not rewarding it, while rewarding and providing an incentive for long-term investment in research and development.

My specific question is where should he put that money in order for your corporations to derive the maximum benefit from such a decision to make a long-term investment?

Dr. LENARD. Could I just add something to the previous point?

It seems to me that you were suggesting a system where, somehow, you got the tax break if you left your money in that investment for a sufficiently long period of time.

Mr. MCHALE. Yes.

Dr. LENARD. Which strikes me that it could produce a lot of distortions because then there's no—once you're in, if the penalty is really great for pulling out earlier than ten years, there could be loads of much better investment opportunities, socially much more productive and individually much more productive, which people would not be able to reallocate their funds towards because the penalty was so great for doing that. So I think that scheme could possibly produce a lot of distortions.

Dr. KAPPER. I'd like to make a point. It's not relative to the tax code, but it's relative to long-term investment or investment of any capital by any company. And that's the liability issue.

That's one of the things that I would really encourage you all to consider looking at.

One of the points I had made before was the liability of potentially reducing a lot of hazardous waste and making it useful into products.

We won't do it because of the potential liability. I think that if you take a look at Title 40, which is somewhere between 16 and 17 volumes of probably 12,000 to 14,000 pages of regulation, there needs to be some simplification. We need to take a look at the liability issue and RCRA and some of the others as well.

Mr. MCHALE. Doctor, I understand. If we could come back, if I could refocus for just a moment in the brief time we have remaining.

Understand that the liability questions would have a significant impact on the decision of a corporation to make such a long-term investment.

What I'm really thinking is let's say that we do have a consensus in the Congress that capital gains tax should be reduced. And let's assume that the reduction in that capital gains tax does produce a transfer of assets and a realization of profit on previously held capital assets.

What I'm looking for is a discussion and perhaps some guidance on the point of where that realized profit should be reinvested in

a way that maximizes external, third-party, beyond the corporate structure investment.

Savings and investment, we've all been calling for over the years that the United States—we as a nation simply don't save and invest enough.

Well, if we create a pool of available investment capital by virtue of a cut in the capital gains tax, where should that money be placed in order to maximize the benefit in terms of long-term research and development?

Mr. Mitchell, I've heard your opinion and I appreciate it deeply. But Mr. Greene, I'd be interested in your opinion. Dr. Giordan, I'd be interested in yours.

Where could that private investment reinforce the corporate investment that is, for instance, encouraged by a tax credit?

Mr. GREENE. Let's look at the way that corporations do their investment.

Mr. MCHALE. That's really what I'm asking, yes.

Mr. GREENE. For Kodak, we're not going to the capital markets to raise money. We generate all funds sufficient to fund research and development for our operations.

So for us, certainly we want our shareholders to benefit from the growth in our share price and we're certainly driving for that benefit. But we don't have to go to the capital markets to raise capital.

However, in high-risk projects, it would help us if other people could raise money in the capital markets and join with us in consortia to allow us to be able to share risks in long-term high-risk projects.

So from that perspective, allowing small entrepreneurial companies to grow and they could possibly join up with us to share risk, is a factor and would be of help to us.

Mr. MCHALE. Where would they turn for capital?

Mr. GREENE. Well, they would turn to the capital markets. Now they may have private investors first as partnerships and then later incorporate. But that's where they would turn to, is basically the capital-formation process.

Mr. MCHALE. Dr. Giordan?

Dr. GIORDAN. I'd like to build on what Mr. Greene just said.

There are two types of investment, of course. As we talked about, it's the reinvestment of corporate dollars. Let's say we got a cut in the capital gains as a large company. What would we do?

We've already mentioned that cutting that gains alone would not help us internally—excuse me. It would help us internally quite dramatically, as would regulatory and a number of other issues. But it doesn't necessarily guarantee that we're going to put the money into long-term R&D. We'll put it any way we can to get the money back. Now you're talking about—

Mr. MCHALE. And at this point, I think you move beyond what Mr. Mitchell has been saying.

I think Mr. Mitchell has been saying just that up to this point. Your distinction is drawn between overall profitability and the desire to reinvest that profit in long-term research and development.

Profitability won't necessarily result in an increased commitment toward long-term R&D.

Dr. GIORDAN. Not necessarily.

Mr. MCHALE. Yes.

Dr. GIORDAN. This is not a linear, one-to-one correlation with a correlation factor better than 99, under any circumstances.

Mr. MCHALE. Yes.

Dr. GIORDAN. For those companies that believe very strongly, such as the pharmaceutical end, perhaps it is quite a bit more likely that they would put their money there.

If we take a look, however, at the materials development sectors, the chemical industry, which is the largest single, if you will, we have the leadership in the United States in the chemical industry globally of all chemical industries. And yet, the chemical industry is a very traditional commodity-based industry.

Even in the specialties end, we tend to be very traditional. We invest 3 to 5 percent of sales in research. It's not the 13 percent that they do in pharmaceuticals.

We're very calm and we're very traditional. That's a big problem. Innovative and break-through products don't make it any more. And here is another challenge in that particular one to your question.

If Joe and Joan Q. Public now have the money to invest, how do we help them?

As Mr. Greene said, I couldn't agree more. It would be in the public markets. They'd look for small venture firms, potentially, and those could be smaller firms, firms that even started, as I have mentioned before, through working between larger companies and universities.

I couldn't agree more with Dr. Ehlers that an opportunity of really incenting for working with universities to develop small companies in terms of tax incentives could be a very positive way of making that interaction better.

So, yes, I do believe that a way to help your question would be small company investment that we could then purchase later or could grow later.

Mr. MCHALE. Madam Chair, I really appreciate your willingness to give me an excessive amount of time.

Let me ask one final question, if I may.

Mrs. MORELLA. But, you know, in that last question, if you would yield to me for just a moment, Mr. McHale.

Mr. MCHALE. Surely.

Mrs. MORELLA. There is an assumption that government must drive investment. I just wonder if that isn't inappropriate.

Do we require government to drive investments?

Dr. LENARD. I agree. I think government should basically create a neutral environment, create a neutral tax code, and then let the market decide where the investment opportunities go.

You don't want to encourage companies to investment in long-term investments which are not profitable because they're not socially—because that means that there are other investment opportunities that are better.

Mrs. MORELLA. Thank you. I yield back.

Thank you, Mr. McHale.

Mr. MCHALE. I guess that really comes to the heart of the issue, and that is that, obviously, the person makes the investment if it has favorable tax treatment, with the expectation that a profit will

be realized so that favorable tax treatment will ultimately mean something.

And that, I suppose, is the issue that we're going to have to confront in this Congress in the not-too-distant future, and that is, do we treat all investments equally, regardless of the perceived benefit of that investment to our society?

Do we treat an investment in a summer home as beneficially as we treat long-term investment in scientific research and development?

From the statement that was just made, I think some of you would argue that we should not draw those distinctions and that the market place should prevail.

I think I'm a little bit more focused in terms of how I think we should use the tax code. Without it being unduly cumbersome, I think we can draw a distinction between a long-term investment in research and development and short-term consumption, which is what we've all been decrying for the last ten years.

To treat those two uses of capital as if they were the same would in fact continue to encourage consumption to a degree that we, unfortunately, comparatively speaking, have not done very well in terms of what our international competitors have chosen to do.

The final question I would have would be this. And I think some of you have already answered it implicitly in your earlier responses.

For that fellow who sells the piece of real estate and realizes a $3 or $4 million profit, Dr. Giordan, you said that one of the things that we should encourage is the continuing government role in encouraging programs—let me insert a term here—such as the Ben Franklin Partnership in Pennsylvania, where small corporations working with the university community have been able to nurture those corporations and commercialize their products.

Would we want to give a tax benefit to the fellow who has now realized a profit of $3 or $4 million, if he chooses to invest that sum in one of those Ben Franklin corporations, where we have provided very beneficial tax treatment, not simply because we want him to enjoy the benefit of the money he's earned, though we want that as well, but because there is a benefit to society in reinvesting that profit, perhaps tax-free, assuming he makes a profit, ultimately, in an emerging small corporation that is now being formed on the campus of Lehigh University?

Or do we want to provide identical tax treatment if he chooses to buy a summer home?

Dr. GIORDAN. You're asking me personally a very difficult question. I will do my best to make it brief.

I believe that government should intervene as little as possible in my life and anybody else's life, and I believe that with all my heart.

And therefore, to say that we should start governing a tax code or governing anything else to steer the boat in some direction, I find very difficult to palate.

On the other hand, the boat's going to go some way, anyway. Whether you want to know it or not, it's going to move. So the question is do you help it go in a direction that you feel is valuable

or do you just hope that market forces alone will drive it in a morally conscious way?

Market forces will always drive it in a conscious way to maximize profits for the person investing. Unless you do that, why in the world are you investing?

The hope is that by creating small businesses—this is my opinion—the hope would be, then, by creating small profitable, not nonprofitable, businesses, as Dr. Lenard said, you certainly don't want to invest in unprofitable businesses.

But by creating small or even larger potential profitable businesses for the future, would you like incent that sort of investment? I personally would like to see a bit of a balance in that direction.

Ben Franklin, I think, is a wonderful example of that, for the following reasons.

Number one, it has wonderful opportunities that have grown into excellent businesses. It also has disasters that have fallen apart miserably.

And so, what you have there is the challenge of really being sure that you incent the investment in a way that would be of value to the country in the future, and not guided so strictly that potentially, that particular company or investment might not be valuable.

Venture capital groups such as Sierra Ventures, Philadelphia Ventures—there's billions of them out there—some of them are very reputable and really help guide very strong and good investments, and some are not.

Those sorts of venture capital firms could help guide in some ways, and I'm not saying link up with venture capital, but help guide where the money could go.

That's very important because of one more thing and then I will stop. And that is, if we take a look in this country, venture capital has helped to focus on the building of a biotechnology industry and the building of a computer industry. It's not done very much at all for the building of a materials industry or a chemicals industry. There are very few examples of that.

And if there's any way we want to grow that area, we need to start thinking creatively along those lines.

It's done well in two, but not in the third.

Mr. MCHALE. You've drawn a very fine analogy. I too would not want the government—I don't think the government has the expertise, the wisdom, to choose between competing investments.

I think the choice that we have to encourage, however, is the choice to invest rather than consume, and that's been a fundamental issue facing our nation for at least 20 years.

And so as we steer the boat, I don't want the government guiding the rudder between one investment and another. But I do want to encourage investment and long-term savings rather than short-term consumption.

The person who has that pool of capital may indeed be looking at consumption rather than reinvestment.

Madam Chair, I thank you very much for the opportunity to pursue this.

Mrs. MORELLA. I thank you for your very thoughtful line of questioning and the responses.

I'll be very brief because I know we've gone beyond the time that we asked you to be with us.

I've always wondered—everybody seems to have, in some way or other, talked about capital gains tax reductions, whether it's to zero, whether it's in half, whether it is with reinvesting the amount in long-term projects.

But, you know, I've always been curious about why our major newspapers have not editorialized in favor of capital gains tax reductions, with the exception of The Wall Street Journal and maybe The Washington Times and a few others.

But I always find that, for instance, our local paper, The Washington Post, and even The New York Times, always kind of pit as like a rich versus poor issue. Whereas, there almost seems to be some uniformity in terms of our employers with regard to industry and business to say, hey, you know, we're really out of sync with countries throughout the world and it affects our competitiveness.

I don't know whether you ever do meet with editorial boards or whether you do anything to contribute to that concept because, as a result, I get a lot of letters from constituents who say, they read The Washington Post and whatever, and they say, hey, you know you can't vote for capital gains tax reduction.

Do any of you have any comments you'd like to make on that or are you aware of that? Or are we just particularly sensitive from my situation?

Mr. MITCHELL. I have talked on several occasions to reporters and editorial writers for newspapers. And while I wouldn't claim that this is a scientific study, I think it fundamentally boils down to whether or not you think we have a fixed pie and your concern should be how you slice up that pie or whether or not the pie can grow and everyone will benefit from that growth.

I think that the people who oppose capital gains taxation because they have this zero-sum view of the economy, I just think fundamentally don't understand that capital and labor are complementary goods and the reason that workers in America and Germany and Japan earn more than workers in the Third World is precisely because they're working with capital equipment, machinery, technology, and production processes that allow them to be more productive.

Workers are paid on the basis of what they produce. More capital helps them produce more and increases their wages. But for some reason, some people don't see that. I'm not a psychologist, so I won't try to imagine why.

Mrs. MORELLA. Some kind of education has got to take place, and I think you all have a part to play, too. Just like we try to play that kind of part, too, to indicate what the benefits are going to be to society.

I'd like to pick up on another point, too, and that is the one that—I noted in Dr. Garner's testimony, what he presented, the whole concept of immigration laws.

I don't know that you've all talked about it as an impediment to getting highly trained personnel.

Since you have mentioned it, Dr. Garner, maybe you'd like to pick up on that. Are there immigration policies that are detrimental, that should be changed?

Dr. GARNER. There are ones that are being considered that would have an adverse impact on a multi-national like Zeneca.

We do transfer people amongst our facilities world-wide. We do this for a variety of reasons.

One, we can do a technology transfer. If we're bringing a new product or something into a particular country, we can bring someone with that expertise into the country.

So it allows us to do a very efficient technology transfer. It allows us to bring in people with the skills in the regulatory area of a particular product, for instance, to interface with the government agency in a beneficial way, a knowledgeable way.

So for us, there's all types of advantages to be able to move our people around. Some of the current immigration proposals would prohibit that.

Mrs. MORELLA. But you can now. So you're just saying be cautious of what could happen in the future.

Dr. GARNER. Yes, ma'am.

Mrs. MORELLA. And so it's important that you weigh in with us so that we do know when we can get it to the appropriate judiciary subcommittee on that.

I guess you all talk about the need for education, too, in terms of your training, in terms of competitiveness, is another important factor.

I think you did, Dr. Giordan, and I think others probably did, too, while I was out of the room.

So it seems to me what you're saying is capital gains tax reduction, be careful of those regulations, let's use some common sense in terms of whether they really apply, thinking of Corning and EPA regulations that you have.

In addition to that, access to capital, I suppose. These are some of the major concerns.

Would you like to rank them or any final word you'd like to leave from us? I think you heard some of the statements or the questions that were posed with regard to how far should government be pushing, and should government be picking some companies to give an extra boost to.

So maybe if you'd like to make any final comments in terms of ranking these issues or anything that you didn't get a chance to point out, and include that in your comments, too.

I think you all know the background of what's been going on with this Subcommittee.

Anybody want to comment on that? Well, would you say that they're all kind of equal, that we should look at all of these things, none more than others?

R&D tax credit was another one, of course, which is being extended, but not permanently. Yes, Mr. Greene?

Mr. GREENE. Let me just close, and I'm on that exact point on the R&D credit.

Mrs. MORELLA. Right.

Mr. GREENE. That is something we believe in and something that we believe—

Mrs. MORELLA. Should be permanent, right?

Mr. GREENE. We need some periods to understand what we're going to be entitled to, and that will help us a lot in terms of planning our future. Permanence is a big factor for us.

Dr. LENARD. Let me just suggest that on your last point about picking winners and losers, I think that would be a big mistake if the government got into allocating investment money, trying to allocate it in one particular direction or another. As far as the others are concerned, I think they're all important. I don't know that they're mutually exclusive.

Mrs. MORELLA. As you respond, are we moving in the right direction on the House side? Are we moving too fast on the House side? And I know, Dr. Giordan, I'd love to hear from you.

Dr. GIORDAN. One of the concerns that I do have that I know you were thinking of because we've all talked of it, but it didn't get on your list.

To me, there's the policy and legislation side that is very, very important, from a regulatory aspect, a tax aspect, and things like that. But there's the human aspect. And that I really believe we cannot forget.

And that includes continued university funding and research, and I know that on the House side, there are some very severe questions being asked right now in terms of the amount of money for funding for universities, funding for the government labs, for interactive programs between industry, large and small, and universities, as well as the government labs.

I think those sorts of programs cannot be forgotten. And training programs in anything from kindergarten on up that works on literacy in science is not trivial.

I think that those are sides that one sees far longer term than a monthly or a quarterly balancesheet. But I think that is something that the Congress can very much influence.

You can do things in tax credits and everything that will change things on a very quick basis, and we need to be very careful.

But when we consider issues about training, when we consider programs like the ATP and other programs that incent industries to work together and things like that, and work with universities, that we forget about and say, we don't want to give federal money as charity to industry.

Those are something like bridge programs, that if we forget those sorts of bridge programs along the way, we can be hurting ourselves in the long run as well.

Those are actually programs where you had companies willing to talk to each other and gaining trust in the government. Sometimes you need to incent those a little bit, too, and that trust-gaining shouldn't be forgotten.

So that human side and the interaction side, I think the government can impact a great deal.

Mrs. MORELLA. This is your last shot, folks, so if there are any final comments you want to make. Yes, thank you.

Dr. WYCKOFF. If I could just briefly summarize not only a conclusion of our report, but I think of this panel.

No one tool will serve you sufficiently that you need to retain as many of them as possible. I think this panel has agreed that the

tax incentives are important. But as well, direct federal funding of R&D also has a role because it serves a different function.

Mrs. MORELLA. Thank you.

Dr. Garner?

Dr. GARNER. I think one of the things that's become apparent is that there are a multitude of issues that you all are having to deal with. Some can be addressed more quickly than others. They all will have an impact on us, and do have an impact on us.

I would just encourage that they all be considered, that the regulatory aspect which may be the most difficult to have an impact on long-term, is not ignored, to the extent that maybe a tax credit is easier to do.

The same thing with the tort liability issues, the legal issues that are involved. Those will all have an impact on us and can have a positive impact on us. And while it's difficult, I would certainly encourage you all to continue looking at those issues.

Thank you.

Mrs. MORELLA. Thank you.

Mr. Greene?

Mr. GREENE. I'd just like to close with one comment. We've spent a long time talking about long-term research projects.

The one area we shouldn't forget is the manufacturing/engineering processes. That is, the ability of American companies to manufacture products efficiently.

So whatever we do in terms of long-term research, we must be sure and preserve the benefits, similar benefits for manufacturing processes, either for collaborative development projects or through specific R&D credits that would support that also.

Mrs. MORELLA. Good point.

Dr. Lenard?

Dr. KAPPER. I just support the point that Mr. Greene made for manufacturing companies. It's very important.

Mrs. MORELLA. Good point.

Mr. Mitchell?

Mr. MITCHELL. And if I had one final comment, many of the changes that the House is looking at in tax policy this year are positive incremental steps.

But I certainly encourage the Subcommittee to look at the fundamental tax restructuring debate that I suspect is coming up in the next year or two.

I think that has the opportunity to yield tremendous benefits to the American family.

Mrs. MORELLA. There's a tremendous amount of interest in it now. You're absolutely right. I'm going to ask the unanimous consent for inserting into our record the statements of Mr. Tanner and Mr. Brown. Hearing no objection, so moved.

And I want the panel to know that any additional written comments that you may have that you would like to have inserted into the record, you may do so and submit them, and the record will remain open for two weeks so that you may do that.

I want you to know how much I and the Subcommittee and the Full Committee appreciate your staying for this period of time, sharing with us. We will make sure that the record is one that will be distributed to the others and we will use this as a target for fu-

ture meetings, too. So I thank you all very much—Mr. Mitchell, Dr. Kapper, Dr. Lenard, Mr. Greene, Dr. Garner, Mr. Wyckoff, Dr. Giordan.

[The prepared statements of Dr. Giordan, Dr. Lenard, Dr. Garner, Dr. Wyckoff, Mr. Greene, and Mr. Mitchell follow:]

Statement to the U.S. House of Representatives
COMMITTEE ON SCIENCE
Subcommittee on Technology

Impact of Government Regulatory, Tax and Legal Policy
on
Technology Development and Competitiveness

Judith C. Giordan
September 28, 1995

Prologue:
Based both on my professional training as a chemist, and as someone who is employed in the chemical enterprise, I am most sanguine about the chemical and related industries and the crucial role they play in the US economy. Therefore, while I believe all my comments are germane to the chemical industry, they are broad based remarks which can pertain to all technologically based organizations.

Regardless of the specific industry, it is critically important to acknowledge that for all technologically based enterprises, watershed times are at hand. We have reaped both the pleasure and pain from using tools such as "rightsizing", "reengineering", "flattening structures", "empowerment" and "market focus", often without an underlying vision for the company or its future. (1) However, the "pleasures" of increased profitability, smaller workforces, market focus and the comments by many firms that their most important resource is their employees are more than offset, especially in large firms, by the "pain" of continued layoffs, a focus on short term product development, minimal capital investment, little employee trust or loyalty, and only moderate improvements in production capability and technology.(2)

The low hanging fruit has been picked; saving our way to profitability without substantially improving the top line of the balance sheet - revenues - is at an end. While "how" technological enterprises assure sustained growth can be debated, "what" seems certain is that both:
1. technological innovation - defined as the ability to both create knowledge and use that knowledge to develop and commercialize new profitable products and processes
2. and continuously improved productivity
are imperative for the future. As for Government's role in this process, it must enact legislation to foster and not impede these two requirements. The question is how.

Background:
The US Chemical Industry enjoys the leadership position in a global $1.3 trillion dollar enterprise. In 1994 the US manufactured and shipped $341 billion in product to make up 24% of the world total. Employing over 1 million people, the chemical industry accounts for a substantial percentage of the GDP. The US Chemical Industry pays

wages well above the average for US manufacturing companies, is capital intensive and is the nation's #1 exporter. (3)

In addition, chemicals is one of the most global of all US industries. Now more than ever before the distinction between "foreign" and "domestic" companies is blurred with US based companies having substantial off shore manufacturing and R&D, and foreign based companies having substantial US based capability. This blurred distinction between foreign and domestic is as valid for automakers as it is for chemicals. (4) Recent studies such as "Made in America", published in 1989 by MIT, seek to convince us that America is once again on top based on improvements in profitability and production. However, if this improvement is true, who deserves the credit - the "foreign" automakers and chemical producers who have invested heavily in US manufacturing and infrastructure or America itself? Then comes the real question - does it matter? Are countries really in economic competition with each other? Isn't the important issue one which was raised before -the ability of a country to increase innovation and productivity? (2)

What Next - and What Does Government Do?

For the Chemical Enterprise, and all technological ventures, their life blood is the ability to develop and profitably commercialize technology. To maintain a technological edge in an ever more demanding global competitive environment requires investment, both long and short term, in skilled people, in R&D and in manufacturing facilities. In the past, the infrastructure in this country to support a technology edge for our companies has been sound. In the past, contributing on the technology creation end have been the US's substantial, largely government supported university, federal labs and federal departmental research efforts as well as the large private sector budgets for both research and product development. This structure for technology creation alone is not sufficient. It must be coupled, now more than ever before, with commercialization and manufacturing enablers including reasoned environmental legislation, reasonable cost of money and a tax code which fosters a balanced longer/shorter term view through tax credits and lower capital gains taxes for research and capital investment intending to result in a strong innovation chain of creation and commercialization.

However, even our formidable infrastructure for creation, and the chain of innovation it supported, is in grave jeopardy. Coupled with increasing pressure from globalization of markets, liquidity of technology, better cost of money elsewhere, well educated people worldwide and climates of trust and cooperation between government and industry in other countries far surpassing that found in the US, the guarantee of a globally dominant position for US technical industries, including the chemical industry, into the future is in doubt.

As for increasing productivity, this too requires a favorable cost of capital, a tax code favoring investment and a balanced long versus short term view of research and manufacturing as well as a skilled, motivated, and well informed workforce. Specifically, a workforce which understands the need to increase productivity and maintain high skill levels.

These issues must be addressed and acted on quickly. The question for this forum is what can the role of the Federal Government be from a regulatory, tax code and general legislative standpoint.

While it is well accepted that the Government alone is not solely responsible for the results of the technology enterprise, there is both a climate for growth and trust with industry which Government can foster as well as specific steps which Government can take which can act as strong incentives and enablers to allow both productivity and innovation to take hold and flourish.(5)

Policy and Legislation:
1. A longer term, stable policy environment for all types of legislation. An environment which inspires trust for business - government interactions - not a policy environment subject to the whims of a partisan debate or posturing for election.

2. Policies and laws to help lessen the cost of capital expenditure including:
* monetary policy to help stabilize and lower long term interest rates
* accelerated depreciation schedules
* cuts in capital gains taxes as an encouragement to long term investments

3. Patent legislation agreed to at an international level which respects invention and the rights of the patent holder.

4. Antitrust legislation which assures international competition while allowing for cooperation among companies for productivity growth and job creation.

5. Laws curbing litigation most especially in the amounts of penalties which can be rewarded and in product liability tort reform. Our companies must act responsibly but also be allowed to take calculated risks in advanced technology without fear of devastating reprisals.

Research Funding:
Legislation needs to assure a funding mechanism for government supported research, wherever it is carried out, which focuses on:

1.improving the training of scientists and engineers to include processes to "think outside of the current box" and collaboratively develop new technologies to build new businesses and jobs. This

includes deemphasizing Research Assistantships (grants for graduate students given to professors directly) and reemphasizing Traineeships (grants to University departments and students directly).

2.supporting research to provide both basic scientific information as well as opportunities to develop the information into a commercial enterprise.

3.giving a higher priority for funding of programs in universities or government labs which have the intent and probability of working with industry in developing and commercializing higher risk and new technologies - this is not meant to be short term product focused research at the University level but rather an extension of the current incubator concepts fostering University - industry interactions which can result either in the purchase of the co-developed technology or allowing professors an incentive to stay at universities and develop new businesses.

4.curbing the size and funding outlay in Government labs. While important and valuable, the sheer size of the labs needs to be brought into line with the needs of both our citizens and industry.
5.minimizing the ability of Universities to claim intellectual property rights, especially in joint programs with industry and those funded by the Federal Government. All too often Universities own the rights to intellectual property including patents without ever having the wherewithal for commercialization. This acts as a disincentive to both professors and industry for joint development and cooperation. Universities wishing to retain intellectual property rights, especially for patents, should, at minimum, be required to adhere to a timeline for commercialization or give up rights.

6. assuring the US maintains its innovation infrastructure, this includes maintaining funding for bridge programs such as ATP which act as both a mechanism for building interaction and trust between government and industry, and also work as an incentive for industry to participate in longer term, pre-competitive technology creation. This is especially important in the current climate of high interest rates, low to no research tax credits, and high capital gains taxes.

Tax:
1. A tax, investment and monetary climate which fosters long term investments and longer term higher risk technology development both in the public and private sectors. This new technology creation must serve as the basis for innovation and new markets and potentially industries.

2. A stable and long term research tax credit, with additional incentives in tax credits for company sponsored university research.

Regulatory:
Regulatory legislation is meant to assure an environmentally sound future for the planet, not to act as a detriment and inhibitor of productivity and growth. The excessive fees now paid by all companies to assure environmental compliance - with smaller companies and start ups especially hard hit due to more limited funds - is working to make US companies non-competitive. Regulatory legislation of some sort is necessary but should:

1. require the use of sound science coupled with detailed cost/benefit analysis as the basis for the legislation

2. carefully determine why the legislation must be in existence and how it can be implemented for a minimal cost.

3. not penalize small and start up firms

4. for FDA, curtail time and cost for registration.

Bibliography:
(1) "That Vision Thing", Judith Giordan, Research technology management, August 1995.
(2) "Survey on American Business - Back on Top?", The Economist, Sept. 16, 1995, (3).
(3) A.) Weiner, et al, "Developing a Chemical Industry Strategy: State-of-the-Industry Profile", DOE Report, Northwest Labs, Oct.1994.
B.) "Vision 2020", DRAFT
(4) For the purpose of this discussion, "US based chemical industry" will refer to R&D and production that is US based regardless of the nationality of their ownership. US citizens and residents hold jobs based on it, raise families based on it, pay taxes based on it, and contribute to US competitiveness based on it.
(5) Subsequent remarks are views of the author as well as information obtained from:
A.) Industrial Research Institute, Position Statement on United States Economic and technology Policy, 1995
B.)NAM Public Policy Priorities for 1995
C.)CMA, "Future Competitiveness Report, May 30, 1995.

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In addition to her responsibilities at Henkel, Dr. Giordan is an active member in academic, professional and industrial organizations as a member of the Board of Directors of both the American Chemical Society and the Industrial Research Institute, a member of the Conference Board Advisory Board for Technology Conferences, a member of the Board on Chemical Sciences and Technology of the National Research Council, the operating arm of the National Academy of Sciences, and an Adjunct Professor at North Carolina State University.

The author of over 100 articles and presentations in areas of polymer chemistry, electron spectroscopy, technology leadership and management and diversity, Dr. Giordan has contributed articles and editorials to Research and Technology Management, Chemical and Engineering News and numerous international technical journals.

Statement of

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The Progress & Freedom Foundation

before the

Subcommittee on Technology

Committee on Science

U.S. House of Representatives

September 28, 1995

This statement reflects the views of the author and not those of The Progress & Freedom Foundation.

Madame Chairwoman and Members of the Subcommittee, I appreciate the opportunity to participate in these hearings, which address an extremely important set of issues. Innovation and technical progress are the means by which our nation's overall economic welfare and living standards are improved. We must therefore try to assure that government programs enacted for a variety of different purposes do not create disincentives to the development and adoption of new technologies.

Regulatory programs come in different sizes and shapes. Since necessity is the mother of invention, some of these programs undoubtedly stimulate the development of technologies needed to satisfy specific regulatory requirements. Overall, however, the effect of regulation on innovation is probably adverse. In particular, there are major regulatory programs affecting high-technology sectors of the economy that clearly discourage and delay the introduction of important new innovations of great potential benefit to consumers. These effects are frequently difficult to quantify. The cost of a new technology delivered to consumers several years later than it should be, for example, may not be readily apparent. Even more difficult to discern are the costs of innovations that never are made because development costs artificially have been driven too high. The best recent estimate of the total cost of federal regulation, due to Professor Thomas Hopkins of the Rochester Institute of Technology, is about $600 billion annually or $6,000 per American household. Yet this figure does not reflect the adverse effects on innovation of the regulatory programs I discuss below.

These programs span the regulatory landscape from traditional "economic" regulatory programs, aimed at pricing and entry conditions, to programs intended to protect the public's health and safety. Their common characteristics are:

- they require an approval or license from a regulator for a new product or service to be introduced; and,
- they affect very innovative sectors of the economy.

Granting regulatory agencies product-approval authority tends to increase the costs of innovation and delay the introduction of new technologies, because the incentives faced by the agencies are generally not conducive to rapid approval. The burden of proof is typically on the applicant to show that his product is consistent with the public interest, however defined in the relevant statute. This can be an expensive proposition and regulators frequently raise the costs by requesting additional data on which to base their decision. Moreover, once such a framework is in place, it can be used by incumbents to raise the cost of entry to new competitors.

My testimony focuses on the relationship between innovation and regulation in the biomedical and telecommunications sectors of the economy. The revolutionary developments in biotechnology and computing have had a profound impact on these sectors. These sectors are heavily regulated, however, and this is slowing the innovative process appreciably.

Medical Innovation

The discovery and development of pharmaceuticals and medical devices is a time-consuming, uncertain process that requires years of expensive laboratory work, pre-clinical and, ultimately, clinical testing. It now takes approximately 15 years to bring a

drug to the market, at an average cost that has been estimated at close to $400 million. Many years of costs are incurred before there is even a slight chance of patients receiving new products and of companies earning returns on their investment. This is of special significance for start-up companies, such as the many small biotechnology and device firms which have no products bringing in revenue while they invest heavily in researching new products.

The current regulatory framework for new medical products requires that sponsors of new drugs or medical devices apply to the Food and Drug Administration for marketing approval, submitting data on the safety and effectiveness of their products.[1] The only route to the market is through the FDA.

The effects on innovation in the drug and device industries of delegating the approval process to a risk-averse agency operating in a political environment are exactly what we might expect. The return to research has fallen and become more uncertain, resulting in less domestic product development. We also observe "approval arbitrage," whereby companies concentrate their R&D efforts overseas where the regulatory burden is less onerous. The high regulatory costs and increased uncertainty also deter new entrants into the drug and device industries, reducing the pool of capital available for funding new research. Ultimately, the system as now configured deprives patients of life-saving and life-enhancing products that never come to market because the overall costs of innovation have been driven too high:

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[1] For a discussion, see Thomas M. Lenard, Ralph A. Epstein, Robert D. Tollison, W. Kip Viscusi, and William M. Wardell, *The Future of Medical Innovation*, Interim Report, The Progress & Freedom Foundation, June 19, 1995.

- Despite skyrocketing research and development budgets in the biomedical industries, there has been no corresponding increase in the flow of new drugs and medical devices to the market. The industry's research spending, after adjusting for inflation, is ten times the level it was in the early 1960s. Yet, the output of approved new molecular entities has not increased since enactment of the Kefauver-Harris Amendments of 1962 and remains far below the pre-1962 level.
- The time required to bring a new drug to market, including pre-clinical testing, clinical development and regulatory review has increased from a little more than six years in the mid-1960s to about 15 years in the early 1990s.
- In the medical device area, the number of premarket approval applications decreased from 78 in 1990 to 40 in 1993, while the time for approval increased from 609 to 823 days.
- Medical device companies increasingly are locating research and manufacturing facilities offshore solely because of the regulatory burdens associated with entering the market here.

These are all sobering facts, in the face of the large increases in research budgets and the availability of totally new sciences, such as biotechnology and powerful computing, since the early 1960s. Americans obtain access to fewer new drugs and devices and receive them later than they should. America's procedures for bringing new products to patients are among the slowest and most expensive in the developed world, and it is now routine for new drugs and devices developed by American companies to be available in other countries before they become available here.

The FDA's adverse effect on innovation extends to foods, where it also has jurisdiction and where food additives are subject to a similar premarket approval process. For over twenty years, the FDA has been deciding what to do with the fat substitute olestra that has been found in clinical studies to reduce overall fat intake and to be harmless.[2] The fact that the manufacturer of this product has spent upwards of $100 million before making a single sale has surely not gone unnoticed by others contemplating similar R&D efforts.

Biotechnology

While the influence of the FDA on biotechnology products is obviously strong, these products are also held hostage in other regulatory arenas. Biotechnology holds great promise for the development of more environmentally benign pesticides and more effective bioremediation techniques. Yet, the Environmental Protection Agency's regulatory approach to the testing and approval of these agricultural and other biotech products is discouraging their development, as has been pointed out by Dr. Henry Miller, former head of the FDA's biotech office.[3] For example:

- The development of a promising new biotech product that would prevent frost damage when sprayed on crops was cut short by the establishment of very expensive experimental hurdles by the EPA. The product has thus far not been commercialized.

[2] See remarks of Henry Miller at AEI Symposium on FDA Food Regulation, June 26, 1995.
[3] The examples discussed here are from Henry Miller, "The EPA and your breakfast," *The Washington Times*, July 12, 1994, p. A15.

- The Monsanto Company was denied permission to undertake a field test of a biotech product aimed at controlling a corn-eating insect. Had Monsanto used a cruder "conventional" genetic technique, the field trial would not have been subject to government oversight at all. Monsanto subsequently dismantled its entire microbial biocontrol program.
- EPA's policies have discouraged research on promising new techniques of bioremediation -- the detoxification of wastes using living organisms -- that could increase the effectiveness and reduce the costs of cleanups of toxic waste sites.

The basic problem is that these innovative biotech products are being subjected to higher regulatory hurdles simply because they are based on a new technology, despite evidence that they may well be safer and more effective than conventional alternatives.

Communications

The telecommunications area also offers numerous examples of how the government's licensing authority raises the cost and delays the introduction of new technologies.[4] The 1934 Communications Act gives the FCC broad powers to license (1) wireline facilities and services used in interstate common carriage; and (2) the use of the electromagnetic spectrum. Instead of serving consumers' interests, these licensing powers have lent themselves to abuse by incumbent firms interested in protecting their

[4] For a discussion, see George A. Keyworth, Jeffrey Eisenach, Thomas Lenard and David E. Colton, *The Telecom Revolution, An American Opportunity*, The Progress & Freedom Foundation, 1995.

markets. Few businesses or trade associations can resist the temptation to use available regulatory procedures against competitors:

- For example, although there is now general agreement that competition in long-distance markets has spurred innovation and pushed prices sharply down, the FCC successfully protected AT&T from long-distance competition for several decades. The Commission's previous policy of forbidding competition in long-distance markets cost consumers tens of billions of dollars.
- The Commission's resistance to the provision of "enhanced services" by telephone companies has imposed another layer of costs, as demonstrated by the single example of voice-mail. Today, phone companies provide voice-mail services at roughly five dollars a month per mailbox to roughly ten million customers. Though the technology was available in the 1970s, if not earlier, FCC permission to deploy it did not come until 1988. The cost to the economy from the Commission's delay in authorizing these services has been estimated at approximately $6 billion.
- The FCC's exclusion of phone companies from the provision of video programming and cable television, put in place in 1970, also has been costly. The Commission subsequently came to the view that this policy might be inhibiting competition and began to reevaluate it -- a process that occupied the Commission for five years. In 1992, the Commission concluded that telephone company provision of video-dialtone services should be allowed, but the Commission took another two years to approve the first application to provide such services. Since cable rates are estimated to be 20 to 30 percent lower in markets served by more than one provider, the Commission's

failure to authorize entry by phone companies obviously imposed billions of dollars of costs on cable subscribers.

The barriers to innovation from the FCC's power to license spectrum are, if anything, more striking:

- The introduction of both FM radio and television was delayed for years by FCC equivocation over which bands would be assigned to what uses. FM radio technology, invented in 1933, was not in widespread use until the 1960s. The modern television was exhibited by RCA in 1939, but the FCC took years to adopt initial standards and froze all applications for TV licenses until 1952.
- Cellular technology, first conceived in 1947 by Bell Laboratories, was not introduced commercially until the 1980s. AT&T was operating its first experimental cellular telephone system in 1962, but the FCC did not even get around to allocating spectrum for cellular until 1974. The first cellular licenses were not handed out until 1983. Today, the cellular industry generates some $14.2 billion in revenues a year. The decade of delay is estimated to have cost Americans roughly $85 billion.

Concluding Comments

In sum Madame Chairwoman, innovation is adversely affected by the current regulatory frameworks in critically important sectors of the economy where the technological opportunities are greatest. At The Progress & Freedom Foundation, we have been developing a new framework for bringing medical products to market as well

as a replacement model for current communications regulation. Both of these models would reduce or eliminate the adverse effect the current regulatory structures have on the incentive to innovate. We hope to have an opportunity to share our views as these issues are considered.

Testimony of Dan Garner, PhD

On Behalf of

Cellmark Diagnostics and Zeneca Inc.

Before The

Committee on Science, Subcommittee on Technology
U.S. House of Representatives

September 28, 1995

INTRODUCTION

Madam Chairwoman, Members of the Subcommittee. My name is Dan Garner. I am President of Cellmark Diagnostics, located in Germantown, Maryland. Cellmark is part of Zeneca Inc. (Zeneca), the $2.5 billion bioscience subsidiary of Zeneca PLC. On behalf of Cellmark and Zeneca, I am pleased to provide our written testimony to the Subcommittee's examination of the impact of government regulatory, tax and legal policy on technology, development and competitiveness.

OVERVIEW

The topic of this hearing is particularly relevant to Zeneca and Cellmark, especially with regard to its operations, current investment in product development and, most importantly, how these areas weigh heavily in decision making regarding the future direction of the company -- what geographic markets will be developed, where capital will be invested and in what products, etc.

Madam Chairwoman, Zeneca applauds the Subcommittee's recognition and examination of this important topic. One has only to recall the noteworthy event of 1994 -- passage of the General Agreement on Tariffs and Trade (GATT) -- to recognize what impact international trade barriers have on technology development and innovation in the marketplace. Zeneca supported GATT's passage. The elimination of trade barriers helps keep US businesses competitive in the global marketplace. It is increasing our standard of living. In particular, it is protecting and enforcing the intellectual property rights of our technology-driven businesses.

With the passage of GATT, we can say that we are closing the loop in becoming truly a global economy where information, technology, research and development span nations. In that context, it is now time to turn inward to an equally thorough examination of our own country's legal and regulatory structure. We need to ensure that the same types of impediments do not inhibit equal access to information and

technology transfer as well as to product development which improves our quality of life in the safest and least costly way.

In this context, we would like to provide a brief overview regarding who Zeneca is and what it does -- both internationally and here, in the United States. In laying out this scenario, we believe the issue raised in this hearing will become crystal-clear: that policies promulgated by the U.S. Government have an adverse impact not only on economic business decisions regarding future investment in our U.S. operations, but also on "non-economic" decisions which directly impact the public's health, safety and welfare. Our discussion addresses examples of these so-called "inhibitors" in our domestic legal, regulatory and tax policies in more detail below.

ZENECA -- BACKGROUND

Zeneca PLC is one of the world's major bioscience companies, comprised of pharmaceutical, agrochemicals and seeds and specialty (chemicals and products) businesses. Based in the United Kingdom, Zeneca has 30,000 employees worldwide and sales of $6.5 billion in more than 100 countries. The United States is Zeneca's largest single market. Zeneca is the largest wholly owned subsidiary with $2.6 billion in sales in 1994. Zeneca employs 6,500 working at 45 sites in 29 states, including the company's U.S. headquarters in Wilmington, Delaware.

As a bioscience company, Zeneca has compiled a product portfolio that meets real needs. Our pharmaceutical, agrochemical and specialties businesses provide a broad range of products including world-leading cancer and cardiovascular therapies; a new broad-spectrum antibiotic, advanced crop protection products, and important specialty products for industry and healthcare. Cellmark is one of Zeneca's specialty businesses. Located in Germantown, Maryland, Cellmark is a world leader in human identity testing, using DNA probe technology to establish family relationships as well as the origin of biological samples left at crime scenes. It is also involved in genetics diagnostics research and testing.

Given the nature and range of its product portfolio, it should come as no surprise that Zeneca is a company that invests in the future. Zeneca consistently invests over $800 million annually (on a worldwide basis) -- 12% of $6.9 billion sales in 1994 -- to research and develop the next generation of high technolcgy products. Nearly 25% of our 7,000 R&D staff worldwide are located in the United States. The greater part of our R&D is focused on product development with linkages in biotechnology and organic chemistry. We are very proud of our two world-class R&D facilities located in Richmond, California (Western Research Center [agrochemicals]), and Wilmington, Delaware (Pharmaceuticals).

The results of our R&D efforts have been truly outstanding: Our company has one of the world's strongest product pipelines including innovative therapies for cancer,

asthma and schizophrenia; an important new broad spectrum crop protection fungicide: and a range of new water-based specialty products. Our biotechnology efforts have manifested themselves in: safer products which have less environmental impact; and genetic modification and improvement of fruit and vegetable characteristics -- ranging from enhancing the flavor, color and nutritional content of fruit and vegetables to reducing the lignin levels in trees for paper, thus making pulping easier, reducing the need for chlorine, and improving paper quality.

REGULATORY BARRIERS

Regulatory "inhibitors" to technology development and innovation may, in some cases, involve registration delays or, because of the new "biotech" nature of the product, require additional hoops through which a company must jump in order to secure approval of the oversight agency. Zeneca, by virtue of the highly regulated nature of its individual businesses, certainly recognizes the need for regulatory oversight of its products for efficacy, safety and public health and confidence reasons. However, our businesses have been subject to regulatory hurdles which we believe have not been based on sound scientific rationale, creating substantial time delays for product approval or additional and unnecessary expenses (which bear no relationship to the risk). Clearly, these regulatory impediments come at a cost and impact the decision making of any company. More importantly, they often come at the expense of the public, who have been denied the benefits of life-saving products.

From the perspective of international companies, a more general, yet equally pervasive, regulatory inhibitor to technology is the "uncertainty factor" of US regulation. If it appears to an international company that its ability to develop and market products in a particular country (or, alternatively, to develop them in one market for sale in another market) is subject to substantial unpredictability, then it will choose a market other than the US.

A key example of this was the so-called "circle of poison" legislation which has been introduced in Congress intermittently during the past ten years. That legislation would have prohibited the export of pesticides which were manufactured but not registered for use in the US. In fact, some of the proposals would have placed significant constraints on products registered for use in the US but classified as restricted use chemicals.

"Unregistered" in the US by the EPA does not mean that a pesticide is: (1) not registerable; (2) not untested; or (3) not going to be submitted for registration in the US at some future date. Two examples to support the illogic of the proposed legislation are the following:

* The canola crop in the US is not large enough to justify (on a cost basis) the registration of the latest pesticide manufactured in the US; however,

manufacture of that pesticide in the US for export to and registration in Canada and Western Europe is certainly warranted (where the size of the canola crop is of a greater magnitude);

- Zeneca manufactures the latest agrochemical technology for a pesticide which is directly exported and actively marketed in Korea and Japan for use on transplanted rice crops. Why? There are no "transplanted" rice crops grown in the US. All rice crops grown in the US are directly seeded. The Zeneca pesticide will damage the directly seeded rice crops.

Here are specific instances where development and manufacturing of the latest agrochemical technologies in the US would have been barred at our country's border. Jobs could have been lost and nations would have lost the benefit of additional food production.

A. Food and Drug Administration

The Food and Drug Administration (FDA) is the primary regulatory agency of the pharmaceutical drug industry. Zeneca shares the views of the Pharmaceutical Research and Manufacturing Association (PhRMA) with respect to all of the 14 proposals for FDA reform. Two of these proposals, manufacturing changes and early clinical research, are described below which, if adopted, would provide more rational regulatory mechanisms, lower costs and enable new and safer products to be made available to patients.

Manufacturing Changes. Currently, the FDA requires that the agency review and approve any "chemistry, manufacturing and control" (CMC) changes to a manufacturer's previously approved product PRIOR to the manufacturer being able to do so. Prior review and approval by the FDA is required no matter how minor or technical the change may be. The FDA's current requirement that the agency review and approve CMC technical manufacturing changes before they can be made results in a waste of valuable resources, causes unnecessary delays in implementing new, innovative and beneficial changes which enure to the public's benefit, and represent an economic handicap to U.S. pharmaceutical manufacturers.

PhRMA and Zeneca believe that annual reporting of minor changes in the CMC provisions of approved applications neither undermines the FDA's compliance and enforcement mechanisms nor the public's safety. Rather, it would allow necessary and beneficial manufacturing changes to be made in a timely manner.

Early Clinical Research. Under current FDA policy and guidelines, before a company can commence clinical trials on a new drug, it must first submit an "Investigational New Drug" (IND) plan to the agency containing detailed reports about how the drug is manufactured, the studies conducted in animals, and the studies already performed in

humans in other countries AND wait 30 days prior to commencing the trials. Moreover, the FDA may issue a clinical hold at any time.

Numerous blue-ribbon groups have found that the FDA's approach to early clinical research on new drugs amounts to substantial overregulation and actually discourages new drug research and technology. Why? The administrative costs/burdens imposed on a process in which 80% of the new drugs are dropped prior to the start of clinical trials far outweigh the risk to human safety for those who are the subjects of early clinical research.

As a result, early drug research and development in the US is decreasing at an alarming rate. An increasing amount of this research is being transferred to Europe -- causing a loss of research funds in the US, the loss of new drug development and the loss by clinical investigators (doctors and other researchers) in the US of early hands-on experience with new drugs.

B. Environmental Protection Agency (EPA)

Developments in seed and agro-technology have reached a point today such that we can generate plants which are resistant to or tolerant to certain pesticides -- in essence, plants which are genetically modified to build in natural plant protection from disease and pests. Researchers are able to identify within one living organism which gene(s) cause that plant to be resistant to or tolerant of insect or disease damage. They excise that gene and transplant it into another plant, thus conferring upon the latter the same characteristics of the first plant.

The benefits of biotechnology breeding are two-fold. First, it will enable scientists to breed in certain levels of natural pesticidal proteins -- now already found in nature -- into other species which may be susceptible, hence reducing the amount of chemical pesticides used on the latter. Second, these new varieties can be planted and used in pest management programs.

Plant biotechnology creates a curious new issue: how do we regulate so-called "pesticidal plants"? The EPA has taken the position that plants which have had, through biotechnology, new characteristics introduced into them which give them resistance or tolerance should be regulated by the EPA under the agency's pesticide regulations.

Zeneca shares the views of the Biotechnology Industry Organization (BIO) that, given its expertise and the need for public confidence, the EPA should promulgate regulations to address this new arena. However, we want to stress that such regulations should be sufficient to protect public health and the environment without imposing an artificially high or unduly burdensome barrier to further research and breeding of these new crops.

LEGAL BARRIERS

A. Product Liability and Tort Reform

As a general matter, Zeneca believes the cost to both business and society of the present U.S. civil liability system is apparent. Business is forced to divert expenditure and management time away from its core activities to investigate, prepare for and defend lawsuits that in many cases take several years to get to trial because of the backlog before the U.S. courts. Product liability law in the U.S. presents particularly formidable challenges to Zeneca in several ways.

First, as a foreign-owned company whose businesses are subject to intense regulation, the risk and cost of product liability litigation certainly is a major discouragement to proposed investment in our US operations. At a minimum, this could lead to a reduced availability of funding for integral areas of our US business, such as research and development. Consumers, in turn, suffer from a reduction in the innovative output of our company and the choice and cost of life enhancing or saving products.

The lack of a uniform product liability law in the US becomes even more profound for Zeneca, whose business is conducted in interstate and well as international commerce. On the one hand, our businesses are subject to intense regulation by the Federal Government -- from safety and efficacy testing of our pharmaceutical and chemical products to health and workplace safety standards for our workers. On the other hand, we are forced to operate within an uncertain and inconsistent construct of state laws which govern our liability. We believe that as a matter of fairness, if not due process, states should not be permitted to: (1) impose unlimited and multiple awards of punitive damages for conduct that has never been declared to be illegal; (2) impose liability on one defendant for harm that is due to the misconduct of some other party; (3) impose punitive damages on defendant who make important and life saving products that are developed and marketed in full compliance with pervasive government regulations.

This last point, in particular, makes for a perverse application of law and creates bizarre public policy: our current product liability scheme allows one state's liability law to make health policy for the country rather than the careful consideration of good science by the FDA.

From a cost\benefit perspective, it is easy to sum up the backlash to the litigation juggernaught. Given that it is estimated that it takes an average 12 years and $390 million to bring a new drug onto the US market, manufacturers will be loathe to continue to invest in the research and development of innovative new medical products. New technology and product development becomes stifled if not snuffed out

altogether. Society loses.

B. Antitrust Barriers

Cellmark Diagnostics is one of four "major" players in a concentrated human identity market which, while growing, is still relatively small in terms of market size and share. Worldwide, it is estimated at approximately $50 to $100 million. Although there is limited application of the technology today, the potential for expansion of its applications to other arenas and products has recently emerged. Expansion of product availability in current markets as well as application in new and different markets may depend on future collaboration of financial resources or research technology to achieve these goals and make the industry viable. Cellmark presents an excellent example of how these applications occur. Cellmark has taken its genetic testing core technology -- now used in the US for forensic and paternity identification -- and expanded its application to medical diagnostic applications, such as development of a mouth swab test which detects the presence of cystic fibrosis mutations. The UK has approved the cystic fibrosis medical diagnostics kit.

To that end, Zeneca believes that our laws, particularly those governing antitrust, must balance the public's interest with good and legitimate reasons for business collaboration, the end result of which will produce a stronger, competitive and financially viable industry. We need to ensure that the laws remain flexible to permit legitimate collaboration of product research and the concomitant synergies found within the four major players, all leading to new technology and product development. Unlike Europe, our laws should not discourage our ability to exploit the synergies generated either through acquisition of a similar or complementary concern or strategic alliance with the same. We believe benefits will enure the public: we would be able to expand the current cadre of products available for the existing market, presumably at a lower cost basis. In addition, we would be able to expand our technology application to other new and beneficial applications.

We are also concerned regarding the Department of Justice (DOJ) and Federal Trade Commission's (FTC) jointly issued new Antitrust Guidelines for the Licensing of Intellectual Property. Those guidelines address intellectual property issues such as licensing and acquisitions of patents, copyrights, and trade secrets. Zeneca is particularly troubled regarding the context in which the DOJ will assess the current and future competitive positions of companies with respect to intellectual property matters. DOJ's guidelines indicate the government will examine competitive impact and implications based upon not only existing markets but also what might be future theoretical technology markets -- otherwise known in the regulations as the "innovation market".

Needless to say, the DOJ's position creates tremendous uncertainty regarding what activities the government will deem to constitute violations of the antitrust laws and, more importantly, on what basis. We concerned that these guidelines could prohibit future types of activities/collaborations which we have not yet even identified.

C. Legal Immigration Reform Legislation

Without a doubt, Zeneca believes the proposed restrictions on legal immigration contained in H.R.2202, introduced by Rep. Lamar Smith (R-TX-21) and a draft bill circulated by Sen. Alan Simpson (R-WY), would, if enacted, pose perhaps one of the most formidable legal barriers to technology transfer, product development, and improvements in our quality of life and competitiveness. The House legislation is particularly onerous in that it would make legal immigration very difficult for -- and potentially preclude from entry altogether -- foreign nationals who are researchers, scientists, multinational business executives, scholars and anyone else who can contribute to this country.

The restrictions would prevent many companies, particularly such as Zeneca that are foreign-owned and whose businesses involve cutting-edge technology, from hiring foreign nationals who are currently working with the Zeneca organization abroad. In many instances, these senior level foreign nationals have developed the technology for one of our products as well as shepherded it through the regulatory process in Europe. They possess the expertise in the field or knowledge about the product. They know where issues may arise during the course of the regulatory process. They may bring other resources, such as institutional knowledge of Zeneca's product development and marketing worldwide, to the mix. In short, they are integral to development of the technology or product in the US.

Zeneca's ability to shift such an individual from one of its world operations to the U.S. to develop similar technology here can only benefit the public. Their background knowledge and hands-on experience with the product development can only shorten the regulatory approval time line in the U.S. This method of technology transfer enhances our synergies -- as a global operation -- and, more importantly, allows us to exploit our technologies developed abroad in the US.

OTA TESTIMONY

TESTIMONY OF ANDREW WYCKOFF
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OFFICE OF TECHNOLOGY ASSESSMENT
U.S. CONGRESS

BEFORE THE COMMITTEE ON SCIENCE
SUBCOMMITTEE ON TECHNOLOGY
U.S. HOUSE OF REPRESENTATIVES

REGARDING THE IMPACT OF GOVERNMENT TAX POLICY ON TECHNOLOGY DEVELOPMENT AND COMPETITIVENESS

SEPTEMBER 28, 1995

Congress of the United States
Office of Technology Assessment
Washington, DC 20510-8025

TESTIMONY OF ANDREW WYCKOFF
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INDUSTRY, TELECOMMUNICATIONS, AND COMMERCE PROGRAM
OFFICE OF TECHNOLOGY ASSESSMENT
U S CONGRESS

BEFORE THE COMMITTEE ON SCIENCE
SUBCOMMITTEE ON TECHNOLOGY
U S HOUSE OF REPRESENTATIVES

SEPTEMBER 28, 1995

Madam Chairman and Members of the Subcommittee, I am pleased to have the opportunity to testify before you today.

My name is Andrew Wyckoff, and I am the Program Director of the Industry, Telecommunications, and Commerce Program of the congressional Office of Technology Assessment I am testifying today on the impact of tax policy—particularly, the research and experimentation tax credit—on corporate R&D spending, at the level of the individual firm as well as the entire economy Congress enacted the research and experimentation tax credit in 1981, and although it has been changed several times and has never been made permanent, it remains the primary tax policy instrument for encouraging the private sector to conduct additional research and development

My statements today derive from a background paper on this topic produced by OTA at the request of this subcommittee as well as the Taxation Subcommittee of the Senate Finance Committee The paper, entitled *The Effectiveness of Research and Experimentation Tax Credits*, was released this Monday, and has been submitted today for the record of these proceedings [1]

The background paper itself is based upon three sources of information a contractor report, an expert workshop held by OTA, and independent research conducted by OTA staff The contractor report was prepared for OTA by Professor Bronwyn Hall of the University of California, Berkeley, who is widely regarded as the leading expert in econometric analysis of the

[1] U S Congress, Office of Technology Assessment, *The Effectiveness of Research and Experimentation Tax Credits*, OTA-BP-ITC-174 (Washington, DC OTA, Sept 1995)

R&E tax credit [2] This contractor report and related issues were addressed in a workshop held by OTA on July 19, 1995, which convened 20 experts from industry, academe, the Executive Branch (Treasury, Internal Revenue Service, and Council of Economic Advisors), legal and accounting firms that specialize in the tax credit, and public interest tax and R&D research groups. Finally, OTA staff conducted extensive interviews with senior corporate executives responsible for R&D, financial planning, and taxation, as well as discussions with IRS officials, tax lawyers, and tax accountants who specialize in the research and experimentation tax credit OTA used these three sources of information to assess how well the R&E tax credit is currently understood, identify inadequacies in the existing data and analyses, investigate implementation issues, consider the tax credit in the context of corporate R&D trends and Federal R&D policy more broadly, assess the tax credit's contribution to the development of technology, draw appropriate international comparisons, and specify important avenues for further research [3] Prior to release, the report was reviewed by the workshop panelists as well as a select set of additional reviewers [4]

OTA's assessment of this topic generally concludes that the R&E tax credit is, in principle, a sound policy instrument, and in practice it appears to work as intended The best available econometric estimates indicate that the tax credit generates approximately as much new corporate R&D spending as the Treasury loses in tax revenue However, a complete account of the tax credit's effectiveness requires broader measures of the benefits society reaps from the R&D that is effectively purchased by the tax credit For these measures, unfortunately, there is no adequate information, because it is virtually impossible to tell what *type* of R&D is induced by the tax credit, nor is it possible to determine how much R&D firms would conduct in the absence of a tax credit

At best, OTA's research concludes, the R&E tax credit provides qualified firms with a financial tool, but not a technology tool Most of the credit is used by large manufacturing firms, although access to the credit varies substantially across firms and industries Because of its small size and uncertain effect on R&D strategies, the R&E tax credit is unlikely to have a significant effect on total corporate R&D spending in the United States Nor is the R&E tax credit designed to address particular market failures in private sector R&D spending, such as might be the case, for example, in basic research or some types of generic manufacturing and materials technologies

In light of the available time today, I will discuss only briefly the evidence and reasoning behind these general findings

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[2] Bronwyn H Hall, "R&D Tax Policy During the Eighties. Success or Failure?" *Tax Policy and the Economy* 7 (1993). 1-36 This analysis is the source of the widely cited estimate that the tax credit produces, in the short term, one dollar of new R&D for every dollar in lost tax revenues, and perhaps more over the long term

[3] As explained in the report, current knowledge of the R&E tax credit is insufficient in many respects, and requires new research based on econometric models using IRS tax data as well as survey and interview data OTA originally planned to conduct this research during the Fall and Winter of 1996, and to provide Congress with final results and a discussion of their policy implications in early Spring 1997. However, OTA will not be able to complete this research due to inadequate Congressional funding for OTA in fiscal year 1996.

[4] Please see the attachment for a list of workshop panelists and additional reviewers

The R&E tax credit is an effective policy instrument, as measured by induced R&D spending. In principle, the best method for evaluating the effectiveness of the R&E tax credit is to weigh the return to society from the R&D generated by the policy against the opportunity cost of using the tax revenues for other purposes. If the social return from additional corporate research is very high, then Congress may be willing to give up more tax dollars than the actual research induced by the tax subsidy. On the other hand, if the social return is only slightly higher than the private return, then lowering the cost of research might cause the firm to do too much R&D, in these circumstances, even though the tax credit induces more corporate R&D than the lost tax revenue, higher social returns could be achieved by spending the tax revenue on some other activity.

Unfortunately, although the concept of a social rate of return to R&D is indisputable in theory, it cannot be measured easily in practice.[5] Likewise, it is inherently difficult to determine the opportunity cost of the R&E tax credit's revenue value. How do the productivity gains from the R&D induced by the approximately $1.6 billion in 1992 R&E tax credits compare to the return to society of $1.6 billion in deficit reduction or some other public purpose? For all practical purposes, this question cannot be settled without considerable dispute.

Some analysts, unable to reach any conclusion on the relative social rate of return to R&D induced by the tax credit, consequently have avoided any final assessment of whether the R&E tax credit is an effective and desirable policy instrument. Others simply assume that some form of R&D subsidy is necessary, given the reasonable premise that there are significant social gains from at least some private R&D. Assuming some positive spillovers to society, assessing the effectiveness of the R&E tax credit subsequently becomes a matter of comparing the amount of corporate R&D spending induced by the credit to the dollar value of the credit's revenue cost.

Although conceptually straightforward, existing cost-benefit studies of this sort involve complicated estimates and calculations, and most suffer from data inadequacies, methodological shortcomings, and other problems. *Caveats aside, the best recent studies reach a relatively common finding: the firm-level publicly-reported R&D data indicates that the R&E tax credit produces a dollar-for-dollar increase in reported R&D spending, on the margin.* By this measure, the R&E tax credit can be said to be an effective policy instrument. It is reasonable to expect that the credit would be more effective if it were made permanent.

Although access to the R&E tax credit varies, it is used mostly by large manufacturing firms. In 1992 (the most recent available data), the IRS reported that firms filed for nearly $1.6 billion in research and experimentation tax credits. This amount has fluctuated since the credit's inauguration in 1981, but has remained steady since 1990. The dollar value of R&E tax credits

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[5] Complicating factors include the intrinsic difficulties of establishing adequate price indices for the components of R&D costs specific to individual industries, determining a satisfactory time period within which to assess the productivity gains from R&D, and measuring the depreciation rate of R&D capital stocks. For a survey of these issue, see Bronwyn H. Hall, "The Private and Social Returns to Research and Development: What Have We Learned?", a paper presented at the AEI-Brookings Conference on The Contribution of Research to the Economy and Society, Washington, DC, October 3, 1994.

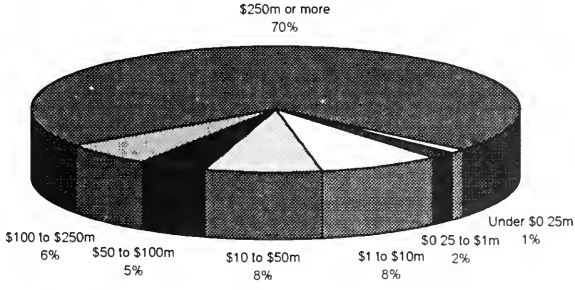
actually received by firms remains unknown In all likelihood, the actual tax subsidy provided to firms is lower than what firms qualify for, since factors such as the General Business Credit limitation, the Alternative Minimum Tax, and IRS audits effectively reduce the actual tax subsidy available to firms

Given the incremental structure of the R&E tax credit, the ability of individual firms to use it varies significantly due to factors such as variations in tax liability, different R&D and sales trajectories, business cycle fluctuations, the type of R&D involved, and whether projects involve either collaborative partners or outside contractors

Since the policy began in 1981, most of the R&E tax credit has been claimed by manufacturing firms, which accounted for three-fourths of the total credit claimed in 1992 (down slightly from prior years) Within manufacturing, 80 percent of the credit is claimed by four sectors—chemicals and allied products (30 percent, with pharmaceuticals accounting for 22 1 percent), electrical equipment (18 percent), transportation equipment (18 percent), and machinery (14 percent)

Large firms account for most of the R&E tax credits actually claimed (see figure 1) In 1992, firms with over $250 million in assets claimed 70 percent of the credit; firms with assets between $10 and $250 million claimed about 19 percent, while firms with $10 million or less in assets claimed approximately 11 percent of the credit.

Figure 1: Distribution of R&E Tax Credits by Corporate Size, 1992



Data source General Accounting Office, based on Internal Revenue Service, Statistics of Income (1992)

This distribution in part reflects the concentration of R&D in the United States within large firms However, it also may reflect the difficulties some small firms face in using the credit One small manufacturer of advanced automotive components told OTA that it had to spend $16,000 in consulting fees simply to find out if it qualified for the credit, and after that point had to spend considerably more on documentation and associated administrative costs After all the effort, the

firm discovered that the IRS does not agree with its accounting of qualified R&E expenditures Additional OTA interviews with accounting consultants indicates that this experience is not necessarily unique, although there are no systematic data available to further assess this particular issue

The R&E tax credit provides firms with a financial tool, not a technology tool. At the level of individual firms, the R&E tax credit may have a significant financial impact, especially for liquidity-strapped firms, firms on very rapid R&D growth trajectories (as in the communications and information technology industries), and firms whose R&D performance strongly affects their market valuation (biotechnology, for example) However, even for firms in these circumstances, it is not at all clear that the R&E tax credit plays a major role in corporate R&D strategies, apart from general budgetary considerations OTA's workshop discussion, along with additional OTA interviews with R&D executives, suggest that the R&E tax credit may in some cases generate funds that can be used to speed up the rate of research, but that overall the tax credit does not substantially affect decisions on how much or especially where R&D resources are invested One possible exception to this tendency is the biotechnology industry, which has extraordinarily high R&D demands, long planning horizons, and unusual revenue trajectories Unlike any other sector, the market valuation of biotechnology firms depends heavily upon R&D performance Even in the case of biotechnology, however, R&D strategies derive primarily from fundamental business goals and technological judgments, not the firm's tax status

The financial nature of the R&E tax credit emerged clearly from OTA interviews with various R&D performers Consistently, tax and financial directors were quite aware of the R&E tax credit and assessed its relevance in terms of its pecuniary value to the firm over time, while technology officers and R&D strategists almost uniformly regarded the tax credit as irrelevant to their planning Interview evidence along these lines lends credence to the hypothesis that corporate R&D strategies in the aggregate would not change substantially if the tax credit disappeared altogether This hypothesis does not maintain that the tax credit is irrelevant—rather, it suggests that the credit is only a weak financial signal amid a powerful array of forces that shape individual and especially aggregate corporate R&D trajectories

The R&E tax credit is unlikely to have a substantial effect on total R&D spending in the United States. Relative to other advanced economies, the R&D investment level and technological intensity of U S manufacturing firms have narrowed over the last two decades, particularly in the last seven to eight years At the same time, growth rates in industry-funded R&D have been quite slow, even during the expansionary periods of the late '80s. The recent economic expansion does not appear to have lifted corporate R&D spending all that much—National Science Foundation estimates show a real annual decline of -0 2 percent in industry-funded R&D in 1994 (up from -0 7 percent in 1993), while recent surveys indicate that industry R&D expenditures will show a modest increase in 1995 [6] Many corporations expect to increase

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[6] See Industrial Research Institute, *Annual R&D Trends Forecast* (Washington, DC: IRI, November 1994); Jules Duga, Steve Millett, and Tim Studt, "Battelle-*R&D Magazine* 1995 R&D Forecast," *Battelle Today* (April 1995) 4-7

their R&D expenditures over the next several years, yet few foresee R&D investment rates returning to the high levels of the early to mid 1980s

In addition to R&D investment levels, the composition of corporate R&D in the United States also has changed in recent years Many U S businesses—particularly in highly global manufacturing industries—appear to be conducting increasingly less basic research, and overall are shifting R&D resources more toward innovative efforts with near term promise of return on investment. Numerous recent accounts of industrial R&D trends indicate that many manufacturing firms are shortening their R&D time horizons in response to financial market demands as well as broader competitive pressures Available survey evidence, such as that from the Battelle Memorial Institute and the Industrial Research Institute, largely confirms this story [7]

By most accounts, recent changes in industrial R&D strategies can be attributed to competitive pressures which, through various channels, have increased cost and performance demands on corporate R&D In principle, this relatively stringent investment climate might increase the significance of R&E tax credits, at least to the extent that the credit reduces the cost of capital for R&D investments

However, the credit never has represented a significant portion of total non-Federal funds for corporate R&D (see figure 2) In percentage terms, the R&E tax credit peaked at 3 1 percent of industry R&D funds in 1984, since that time, the credit decreased steadily to 1 6 percent of non-Federal industry R&D funds in 1992 Similarly, the credit accounts for only a small percentage of total R&D investment at the level of individual industries Consequently, the R&E tax credit is unlikely to have a substantial effect on aggregate R&D spending in the United States

The tax credit performs a very different policy function than direct R&D funding. The R&E tax credit represents one of numerous policy instruments for supporting R&D in the United States In terms of size, the tax credit is small relative to either total Federal R&D funding or Federal R&D funds distributed to private industry (see figure 3) In 1992, the value of R&E tax credits claimed represented the equivalent of 2 6 percent of total Federal R&D funding and 6 4 percent of Federal R&D funds for industry, both values having increased since 1987 as Federal R&D funding has declined [8] Clearly, direct funding mechanisms represent the largest component of Federal R&D policy, but size alone does not suggest value or performance assessing the relative value or effectiveness of R&E tax credits requires comparisons with other policy mechanisms designed to achieve the same outcome

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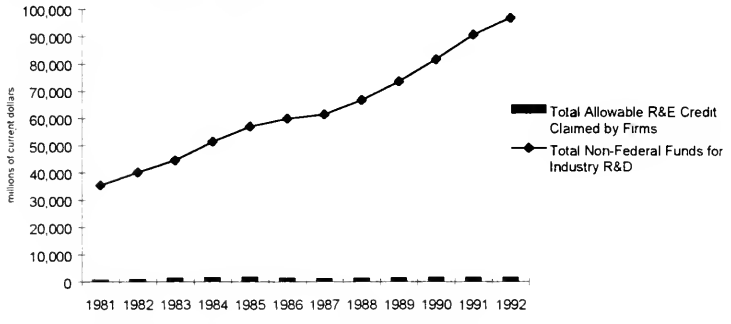
[7] Jules Duga, Steve Millett, and Tim Studt, "Battelle-*R&D Magazine* 1995 R&D Forecast," *Battelle Today* (April 1995) 7 Industrial Research Institute, *Annual R&D Trends Forecast* (Washington, DC: IRI, November 1994), see also M F Wolff, "U S Industry Spent $124B on R&D Last Year, as Real-Dollar Decline Appears to Level Off," *Research-Technology Management* 38 3 (May-June 1995) 2-3

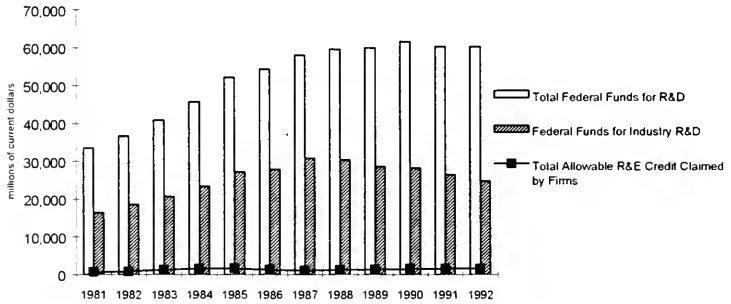
[8] Based on IRS SOI data and NSF data provided in NSF, *National Patterns of R&D Resources: 1994*

Figure 2: Total Annual R&E Claims Compared to Total Non-Federal Industry Funds for R&D, 1981-1992



Data source IRS/SOI, NSF, National Patterns (1994) Note Total allowable R&E represents credit claimed by firms, actual credits disbursed in any given year are likely to be much lower (see text) Industry R&D funds represent all non-Federal sources of funding

Figure 3. Total Annual R&E Claims Compared to Federal R&D Funding



Data source IRS/SOI; NSF, National Patterns 1994

Any assessment of the relative effectiveness of different policy tools for subsidizing R&D should be based on the nature of the R&D market failure being addressed If the market failure in private sector R&D spending is uniform across all sectors and types of research, then relatively undifferentiated policy tools such as the R&E tax credit appear appropriate If R&D market

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University of California,
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Robert Eisner
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Executive Office of the
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University of Pennsylvania

Stephen M. Millett
Battelle Memorial Institute

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Office of Technology
Assessment

failures vary, however, then the R&E tax credit may be less effective because it provides no explicit mechanism for favoring some types of R&D over others

Economists have long argued, for instance, that R&D market failures are particularly pronounced in the area of basic research, since estimates of the social rate of return are very high while the ability to appropriate the benefits is typically low [9] If the central policy goal is defined as a market failure in the provision of basic research, then the R&E tax credit may not represent the most effective policy instrument for two reasons First, the tax credit encourages industry to do more of what it already does, and industry generally directs comparatively little of its R&D resources to basic research (approximately 8 percent, according to the NSF) For the United States as a whole, the Federal government accounts for most basic research funding, while private industry accounts for most development and applied R&D funding Second, the tax credit itself cannot be used to favor basic research spending per se because the definitional criteria for qualified research and experimentation expenses under the tax credit have nothing to do with traditional distinctions between basic, applied, and development research

In short, the effectiveness of the R&E tax credit depends in part upon the definition of the problem, and there appears to be no common understanding of the R&D funding problem If the policy goal is to increase private sector R&D at the margin, with little or no impact on the allocation of R&D resources across different technologies or research areas, then the R&E tax credit may be an appropriate and relatively effective policy instrument If the policy goal is to rectify the market's tendency to undersupply basic research or some other particular types of technologies, such as infrastructural or "generic" research, then the R&E tax credit may be relatively ineffective due to its inability to substantially alter the allocation of R&D resources across different research activities [10]

To conclude, OTA's research indicates that the R&E tax credit is a useful policy instrument, and it could be improved by making it permanent However, in the aggregate, the policy has a relatively negligible effect on total R&D spending in the United States Moreover, it may not be well suited to address particular types of market failure in the provision of R&D by the private sector, such as for basic research or other forms of R&D characterized by high social rates of return and low appropriability

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[9] For example, see Edwin Mansfield, "Rates of Return from Industrial Research and Development," *American Economic Review* 55 (1965) 310-22, and Edwin Mansfield, "Contribution of R&D to Economic Growth of the United States," *Papers and Proceedings of a Colloquium on R&D and Economic Growth Productivity* (Washington, DC NSF, 1972) Several participants in OTA's R&E tax credit workshop also expressed this view

[10] Some analysts have argued that certain types of infrastructural or "generic" research are more prone to market failure because, somewhat like basic research, individual firms cannot easily appropriate the benefits of R&D even though the social returns may be very high Examples of such research may include certain types of general manufacturing technologies, materials technologies involving properties such as corrosion and wear, highway durability research, and so forth See John A Alic et al , *Beyond Spinoff: Military and Commercial Technologies in a Changing World* (Boston, MA Harvard Business School Press).

Statement to

HOUSE COMMITTEE ON SCIENCE

Subcommittee on Technology

Impact of Government Tax Policy on Technology Development and Competitiveness

Jesse J. Greene

Corporate Treasurer

Eastman Kodak Company

September 28, 1995

Madam Chairwoman:

I am Jesse Greene, Treasurer of the Eastman Kodak Company and I am pleased to have the opportunity to share with you and the Committee our views on the subject of incentives to technological innovation. In developing this testimony, I have worked closely with Dr. Jim Meyer, the company's Chief Technical Officer and Director of Research. My own technical background includes work as a mechanical engineer at both IBM and Grumman Aerospace.

There is no question that research and development (R&D) produces an economic benefit to the nation and that it has been a major factor in our long-term economic growth. Sources as diverse as the National Association of Manufacturers, the Department of Labor, and the National Bureau of Economic Research have all conducted studies supporting this conclusion. Consequently, it is also logical to conclude that those policies which foster R&D spending, such as tax incentives, are also beneficial because they lead to productivity growth, improved competitiveness and advances in our standard of living. The tax costs of such incentives are recovered through economic growth and are a wise investment in our future prosperity.

The history to date of the existing research and experimentation (R&E) tax credit, certainly in the Eastman Kodak Company, shows that additional research and development activities have been supported by the R&E credit. However, the current structure of the credit has eliminated the benefit to Kodak. As Kodak strives to be more efficient with its R&D expenditures in the face of continuing competition and price pressure from abroad, its expenditures have leveled off and the credit has ceased to exist. The key question at this point is, however, has the credit really stimulated highly innovative, high-risk, high-reward research as well as critical research into key process technologies? Our concern is that, as structured, the tax credit is not reaching its full potential and could be significantly improved. We therefore applaud the Committee's interest in this topic and its willingness to address the complex relationships that exist between the tax code, other regulatory policies and technological innovation.

In the face of global competition, including intense pressure on corporate costs and other resources, as well as the need to shorten cycle times and improve performance, research and development has been a critical component of corporate success. The value of <u>all</u> types of R&D, ranging from fundamental scientific investigation, where the government and universities naturally have the largest role, all the way to product development, clearly an industry responsibility, remains unquestioned. The key issue seems to be how to best stimulate the technology transfer process from basic science to product development.

Starting with the existing R&E tax credit, there are some significant opportunities for improvement. First, as has often been pointed out, the tax credit, however it is structured, needs to be permanent in order to facilitate tax and financial planning, especially with respect to long-range research projects. Second, the current method of computing the credit is outdated since the base amount still depends on 1984-88 spending levels. This means that some industries over benefit and others under benefit, depending on where they were in their overall growth cycle during those years. Third, because of its incremental structure and outdated base period, it is "incentivizing" growth companies which would have likely incurred R&D spending even without the credit, while many manufacturing companies, like Kodak, are currently unable to use the credit. Finally, a permanent, flat-rate structure would have the advantages of simplicity and clear visibility of impact for those planning R&D activities.

One proposal currently under consideration is the graduated incremental research credit introduced by Mr. Archer. We feel this combines the best features of both the flat and incremental versions of a credit. Because it kicks in at a lower threshold, more manufacturing companies such as Kodak can participate. And because it contains a progressive rate structure, it rewards increasing amounts of research activity.

While we believe the Archer proposal to be a significant improvement, we believe that its biggest impact may well be on <u>where</u> R&D activity is conducted rather than on <u>how much</u>. Favorable treatment of domestic R&D in the tax code will serve to offset the incentives offered by foreign governments to US-based companies to conduct R&D outside the United States. Many foreign countries in which our international competitors are based have sizable R&D incentives: e.g., Australia (150% deductibility, special grant programs); Canada(capital expenditures currently deductible; a 20% investment tax credit); France (an incremental 50% credit); and Japan (an incremental 20% credit). It is appropriate for multinational companies to do R&D close to their major customers; these decisions, however should be driven by market considerations rather than relative treatment in various national tax codes.

Looking ahead to other incentives that would address the technology transfer issue and would in fact lead companies to invest in conducting more high-risk, high-reward basic and pre-product R&D in collaboration with universities and industrial consortia, we believe such incentives would have to consider the following concerns:

- Offsetting the upfront opportunity and overhead costs associated with establishing and managing multi-company collaborative ventures.

- Offering the corporation a lower-cost option to pursue a high-risk, fundamental technology without the premature commitment to build a costly internal capability in the technology. The net result for the corporation is an R&D project portfolio containing a higher percentage of high-risk, high-reward technical projects than would be possible with only internal staffing.

- Reducing the significant internal costs associated with transferring new technology into the corporation from a collaborative venture.

Our experience in an existing government/university/industrial joint R&D program, the National Science Foundations Centers of Excellence, convinces us that such collaboration can be successful. Our joint optics R&D activity with Xerox and the University of Rochester, for example, has proven highly effective. Because these programs rely on increasingly scarce government funds, however, their ability to stimulate widespread collaboration is limited. We think that the government could attain even greater leverage through tax-based incentives. In order to induce greater enthusiasm among R&D managers for this type of approach, we believe that the magnitude of a tax credit would likely have to be large: 20 to 50 per cent of the R&D investment in such collaborative ventures. Further, such a tax policy should be undertaken with the specific intent of inducing more high-risk, exploratory technical work to be done in the country as a whole. This policy should not be pursued in order that the Federal government could reduce its role in the funding of basic, fundamental R&D in the academic sphere as a consequence of increased industrial involvement.

Lastly, Federal incentives should also recognize the importance of incentivizing participation in collaborative ventures for manufacturing process R&D, such as the National Center for Manufacturing Sciences. Although not high-risk research, such R&D is critical to the manufacturing competitiveness of the US. Further, since many companies lack the capability to conduct such work on a strictly internal basis , these collaborative ventures allow US companies to develop manufacturing process expertise that they otherwise would have to obtain from off-shore competitors, e.g., Japan. As an example of this type of incentive, the proposal by Mr. Zimmer is excellent in concept because it would inspire teamwork among US companies and prevent duplication of costs. His proposed 20% flat rate applied to R&D conducted collaboratively through a 501(c)(3) consortium, should, however, apply to any joint pre-competitive research undertaking, not just those conducted in a tax exempt vehicle.

In closing, the Eastman Kodak Company believes that tax policies that incentivize innovation by US companies at home, such as those I have described above, are sound public policy because:

- they benefit consumers through faster development of better products at lower costs;

- they increase employment, both of the companies directly involved in the R&D as well as those employed by other companies (such as suppliers and distributors) whose businesses grow due to the technological advances obtained through the research;

- they maintain the United States' strong position as both a technological and economic leader in the global marketplace.

Finally, I hope the Committee will recognize that the benefits of an enlightened R&D tax policy extend well beyond the particular companies filing the tax returns. They inspire beneficial activities that, in this age of market-driven consolidation, downsizing and cost-cutting, might not otherwise be undertaken. For this reason, we believe that it is essential for all Members of Congress to work together to address this important issue.

The Heritage Foundation

Congressional Testimony

Tax Policy, Technological Innovation, and Economic Growth

Testimony presented to the House Science Committee

by Daniel J. Mitchell
McKenna Senior Fellow in Political Economy
The Heritage Foundation
September 28, 1995

Mr. Chairman and members of the Committee, my name is Daniel Mitchell, Senior Fellow in Political Economy at the Heritage Foundation. I appreciate the opportunity to testify today on the critical impact of tax policy on technological innovation. This is not a trivial issue. What we are really talking about, I believe, is how government policy affects the economy's rate of growth and ultimately the well-being of all Americans.

Unfortunately, federal government tax policy is one of the major impediments to economic growth and technological innovation. If one believes the marketplace is the best judge of how investment, research, and innovation should proceed, our current tax system deserves very low grades.

There are four significant ways tax policy can interfere with a smoothly functioning market economy:

1) ***High marginal tax rates***. The best known impediment to economic growth is high marginal tax rates. In simple terms, the marginal tax rate is the amount of every additional dollar of income earned that is taken by taxes. Needless to say, the higher the tax rate, the lower the individual's reward for working, saving, investing, and taking risks. With federal income tax rates on successful entrepreneurs now hitting almost 40 percent, not to mention the added burden of state and local income taxes, there is widespread evidence that many taxpayers have responded by reducing their economic output. To minimize the harmful impact of taxes on incentives, a well-designed tax system should limit the maximum tax rate to more than 20 percent.

2) ***Multiple taxation of capital income***. In terms of technological innovation, risk taking, and investment, this may be the most damaging aspect of our current tax system. The previous section explained the economic damage of high marginal tax rates, but the actual impact of the tax system on productive behavior was dramatically under-estimated because the income generated by investment and risk-taking is subject to more than one layer of tax. Consider the following example:

> A young high-tech company announces that it has developed a new product that will provide considerable benefit to consumers. On the expectation of higher income, stock in that company will rise. A stockholder who sells the stock will be subjected to a *28 percent* capital gains tax. In economic terms, that is **one layer** of tax on that future stream of income. As that income is actually realized in the future, the corporation will pay a *35 percent* corporate income tax on the earnings. That is the **second layer** of tax on the same income stream. When the remaining income is distributed to shareholders, it can then be taxed a **third time**, at rates up to *39.6 percent*, by the personal income tax. And then, to add insult to injury, if the taxpayer has managed in spite of all these obstacles to accumulate enough wealth to pass on to his heirs, that same income will be socked for the **fourth time** by a *55 percent* estate tax.

Fortunately, not all capital income is punished this severely, but double-taxation is the norm and triple-taxation is quite common. As a result, the real tax rate on productive behavior is usually considerably higher than the statutory tax rate. A properly structured tax system would tax all income, but never tax a single dollar of income more than once.

3) ***Tax code industrial policy***. To the extent that policy makers, through the use of deductions, credits, penalties, exemptions, and surtaxes, attempt to punish and reward different behaviors, they are putting their preferences over the wisdom of the market place. Oftentimes, the motives for these policies are good. The R&D tax credit, for instance, plays an important role in current law considering the need to offset the punitive taxation of returns to investment. A pure tax code, along the lines of the flat tax developed by Professors Robert Hall of Stanford and Alvin Rabushka of the Hoover Institution, would not require these special provisions.

4) *Complexity*. According to the Tax Foundation, America's tax system imposes $192 billion of compliance costs on the productive sector of the economy. This is not the money that taxpayers send to Washington. It is not an estimate of the foregone economic growth. It is simply the value of the resources which are needed for accountants, lawyers, lobbyists, and others in order to comply with a needlessly convoluted tax system. A tax system which was designed to minimize these costs could free up more than $100 billion in talent, time, and ability that could be better used to help make America more competitive.

Economic history, both in America and around the world, give ample reason to believe that the private marketplace will devote the appropriate level of resources to risk-taking, technological innovation, and investment if government-imposed barriers are taken away. If members of the Committee are interested in a tax system that satisfies all these objectives, they would be well advised to examine the flat tax. Not coincidentally, the country whose tax code most closely resembles the flat tax -- Hong Kong -- is also the country that has had the fastest economic growth in the world in the post-World War II era.

Finally, another benefit of a flat tax is that the many talented and intelligent people who currently believe their highest-valued use is to work as tax lawyers, accountants, financial planners, and lobbyists would be able to turn their considerable abilities to endeavors that add to our national wealth. And perhaps, in an America where the tax system was designed for only one purpose -- to collect the needed revenue is the least complicated, least destructive way possible, our best and brightest students would decide it was more profitable to become scientists and engineers rather than tax professionals.

Thank you very much and I would be happy to answer any questions.

Mrs. MORELLA. Thank you. The meeting is now adjourned.

[Whereupon, at 1:15 p.m., the hearing of the Subcommittee on Technology was concluded.]

[The following material was received for the record:]

APPENDIX

PREPARED STATEMENT OF THE ENGINEERS' PUBLIC POLICY COUNCIL OF THE AMERICAN ASSOCIATION OF ENGINEERING SOCIETIES ON FEDERAL TORT REFORM

AN ENGINEERING PERSPECTIVE

The Engineers Public Policy Council of the American Association of Engineering Societies believes federal legislation addressing the inequities, uncertainty and excess costs of the civil justice system is long overdue. AAES is a multidisciplinary organization dedicated to coordinating the collective efforts of over 800,000 members to advance the knowledge, understanding and practice of engineering.

To be sure, effective tort litigation is needed to promote safety and justly compensate injured parties. But the current system, on balance, does neither efficiently and its expanded rules actually harm more consumers than they protect. Current rules make it easy to turn an innocent party into a defendant, distribute liability poorly, slow recovery of damages, reward excess, and ignore personal responsibility. The resulting costs—both direct and indirect—of these deficiencies are clear: wasted resources, high insurance premiums, less innovation, higher prices for goods and services, and a lower standard of living.

Products and Services

Traditionally, federal tort reform efforts have been focused largely on manufacturers, and AAES continues to support reasonable federal ground rules to reform product liability laws. But given the impact of the service sector on the U.S. economy, if reform in key areas of tort law is to be effective, serious consideration must be given to applying some uniform standards to all tort cases affecting interstate commerce, particularly in fundamental areas such as joint and several liability and punitive damages. Otherwise, service providers will be inadvertently subject to greater liability than manufacturers.

National Problem

We realize that tort law is primarily the responsibility of state courts, and we find encouraging tort reform occurring at the state level. However, given that 70% of products and many services are involved in interstate commerce, the need to supplement the current patchwork of conflicting state liability rules with predictable baseline federal standards in some key areas is compelling. Even the National Governors Association, which rarely supports preemption of state laws, has recognized the national nature and extent of the problem and is calling on Congress to act.

Liability and Innovation

While the inefficiencies and uncertainties of tort litigation makes all Americans susceptible to baseless claims and disproportionate damages, engineers are particularly vulnerable because they design, construct, and operate the products, plants, infrastructure, and processes our technological society demands. While often taken for granted, the success of almost all businesses depends in large part on its ability to innovate. Engineers practice innovation every day and they are very concerned that current rules frustrate innovation and the commercialization of new technologies. Admittedly, it is not yet clear whether current product liability laws reduce overall private R&D investment or the number of patents. What is clear, however, is that litigation costs and uncertainty often prompts a reallocation of research dollars, determines what product lines a company pursues or terminates, and diverts critical resources away from productive investment such as R&D.

In a 1992 survey of CEOs, the Conference Board found that worry about liability lawsuits caused 47% of firms surveyed to discontinue one or more product lines, 25% stopped certain R&D, and 39% decided against marketing a new product. Sepa-

rately, in a 1994 American Consulting Engineers Council member survey of 5,000 consulting engineering firms, 72% of firms said that the threat of liability thwarted the use of innovative technology, and 90% of the firms indicated that they turned down work in the past year because of the threat of litigation.

Clearly, innovation involves risk. And how engineers manage risks and tradeoffs presented by a litigious society varies by industry. The chemical, automotive, commercial aviation, pharmaceutical and general aviation industries are often cited as industries heavily affected by product liability concerns. Far reaching liability laws weigh heavily on routine engineering decisions at all stages including development, design, materials selection, construction, and production. While some suggest that the reach of the liability system is justified because it deters unsafe practices, many businesses maintain that safety incentives provided through regulations, market demands, and protecting a firm's reputation far outweigh incentives provided by liability. In fact, a 1991 Brookings Institution study found that the link between liability and safety is weak at best.

Therefore, if engineers are practicing overly defensive design and businesses are holding off on new technology, rethinking breakthrough research, and withdrawing from high-risk lines of business based not on cost, safety or technical feasibility but on the fear of having to settle a baseless claim or paying disproportionate damages; then the costs of the current tort system must be outstripping its benefits. That some companies slow new designs and safety improvements for fear that a future plaintiff will claim that something about the former design must have been unsafe demonstrates how counterproductive the current system can be. We must be able to justly compensate injured parties without discouraging creative ideas and risk-taking in favor of projects where risks are more easily managed. If not, then the current system will continue to work against the very innovative technology, productivity, and new jobs that Congress and the administration are working so hard to encourage.

Joint and Several Liability

The doctrine of joint and several liability is of particular concern to engineers. Under this rule, a defendant can be forced to pay 100% of damages even if their wrongful conduct is only minimally responsible for the harm relative to other parties. It is based on the premise that when the conduct of two or more parties combines to produce an injury, it is more important to make it easier for plaintiffs to collect their full economic and non-economic damages than it is to distribute damages fairly among all responsible parties.

The problem is that the defendant with the thickest wallet often pays a wildly disproportionate share of damages to make up for others either not in court or without the means to pay, which then leads to more litigation as defendants sue one another over the proper distribution. We believe this rule should be replaced with one in which defendants pay damages equal to their proportion of the harm relative to other wrongdoers, at least for noneconomic damages such as mental suffering and emotional distress which are highly subjective and volatile. We also believe such reform should apply to all civil cases involving interstate commerce, not just products liability litigation.

Punitive Damages

Another area that should be reformed and include all civil cases is the punitive damages rule which is designed not to compensate a plaintiff for loss, but to punish wrongdoers and deter similar conduct by others. Given that the threat of punitive damages can be used as a type of legal extortion to encourage expensive settlements, and because this type of penalty is closer to criminal punishment, we believe a higher burden of proof is needed to promote fairness and reduce the uncertainty this causes for businesses and insurance providers. We believe that damages should be awarded only on "clear and convincing" evidence of "conscious, flagrant indifference to the safety of others."

AAES Recommends That Congress Set Uniform Rules for Products and Services That Serve To:

- Encourage negotiation over litigation and early resolution of disputes through **expedited settlements** and state-approved voluntary **alternative dispute resolution** procedures such as arbitration or mediation. This would reduce the number of weaker and baseless claims from back-logged courts and their resulting costs. Under the current system, a victim must wait an average of 2½ years for a verdict.
- Eliminate joint liability and hold each defendant liable only for the amount of damages assessed in direct proportion to their share of the responsibility rel-

ative to all other parties. The present **joint and several liability** doctrine is fundamentally unjust and adds unduly to the inequities and costs of litigation.

- Emphasize personal responsibility by limiting liability if the claimant who by **misuse or alteration** contributed to the damage or injury. The tort system should hold everyone to a reasonable standard of care.
- Apply **punitive damages** only in cases where there is "clear and convincing evidence" that the conduct in question was carried out with a "conscious, flagrant indifference to the safety of others."
- Encourage the return to a **fault-based (negligence) standard,** rather than **strict liability,** to determine a defendant's liability. When strict liability is applied, the defendant's fault or conduct is irrelevant. The trier of fact should consider whether a product, process or structure was designed, manufactured or built to safety standards of its day, conforming to the state of scientific and engineering knowledge at the time of completion or delivery.
- Establish a two-year **statute of limitations** for liability suits, beginning when the claimant discovers or should reasonably have discovered the harm and its cause. This would actually open courthouse doors in states that use the date of the claimants *exposure* to the harm as the starting point of their right to bring a claim.
- Establish a **statute of repose** to limit the liability period to the intended scheduled life cf a product or structure, or the service life set forth in applicable state statutes, whichever is less. While engineers often have little control over how a product is altered, used or maintained, sometimes by many different owners, they are open to endless liability.
- Limit expert opinions with respect to **scientific and technical testimony** to that which is relevant, reliable, and well grounded based on what is known. Consideration should be given to the scientific methodology employed, tests conducted and error rate found.

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